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Vol. I June 21, 1946 No. 24

UNITED STATES DEPARTMENT
OF COMMERCE

HENRY A. WALLACE, *Secretary*

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LIST OF ABBREVIATIONS

BELOW ARE LISTED ABBREVIATIONS USED IN BIBLIOGRAPHY FOR THE NAMES OF GOVERNMENTAL AGENCIES AND OTHER ORGANIZATIONS ISSUING REPORTS.

AAF	ARMY AIR FORCES	NAVORD	NAVY DEPARTMENT BUREAU OF ORDNANCE
AMC	AIR MATERIAL COMMAND	NAVSHIPS	NAVY DEPARTMENT BUREAU OF SHIPS
ATSC	AIR TECHNICAL SERVICE COMMAND	NDRC	NATIONAL DEFENSE RESEARCH COMMITTEE
BIOS	BRITISH INTELLIGENCE OBJECTIVES SUB-COMMITTEE	OPRD	OFFICE OF PRODUCTION RESEARCH AND DEVELOPMENT
CIOS	COMBINED INTELLIGENCE OBJECTIVES SUB-COMMITTEE	OSRD	OFFICE OF SCIENTIFIC RESEARCH AND DEVELOPMENT
CWS	CHEMICAL WARFARE SERVICE	QMB	QUARTERMASTER BOARD
FIAT	FIELD INFORMATION AGENCY, TECHNICAL	QM	QUARTERMASTER CORPS
JDL	JAHRBUCH DER DEUTSCHEN LUFT-FAHRTFORSCHUNG	SHAEF	SUPREME HDQ ALLIED EXPEDITIONARY FORCES
JIOA	JOINT INTELLIGENCE OBJECTIVES AGENCY	SIG CORPS	SIGNAL CORPS
NAVAER	NAVY DEPARTMENT BUREAU OF AERONAUTICS	TIIC	TECHNICAL INDUSTRIAL INTELLIGENCE COMMITTEE
NAVDOCKS	NAVY DEPARTMENT BUREAU OF YARDS AND DOCKS	WPB	WAR PRODUCTION BOARD

PB 1306. P. 52. GOSS, W. H. FATS, OILS AND OILSEEDS. 23 P. MAY NOW BE OBTAINED FROM HOBART PUBLISHING COMPANY, BOND BUILDING, WASHINGTON, D. C., FOR $2.00

CHEMICALS AND ALLIED PRODUCTS

Detergents

PB 20673. U. S. WAR DEPARTMENT. QUARTERMASTER BOARD. Report of test of commercial cleaning compound. (Project 7-48) Nov 1942. 3 p. Price: Microfilm-50¢ - Photostat-$1.00
Tests were conducted in two typical Army mess halls to determine the merits of Type-A acid cleaning compound in speed of cleaning, amount of film left on dishes and grease cutting qualities. It was concluded that type A acid cleaner may possess merit as a mechanical cleaner. However, the Quartermaster Board did not consider the results based on the sample tested conclusive and recommended that a test be made to determine the bacteriological merit.

Agricultural Chemicals

PB 21835. HALLS, A. K. Inoculation of food plant seeds with specific strains of microorganisms. (FIAT Final Rept 570) Nov 1945. 3 p. Price: Microfilm-50¢ - Photostat-$1.00
This is a report of an interview with Dr. Otto Siegel who claimed to be able to increase the harvest yields of potatoes and of grain by inoculating the seed material with a particular strain of Azotobacter chroococleum. A culture of the particular strain to be used is simply mixed with the grain or potatoes before planting. Method of preparing culture is described. The interviewers concluded that there was nothing essentially impossible in Dr. Siegel's statements but that there was no evidence to prove the statements.

PB 20635. SCRUTON, H. A. Preparation of fluorobenzene. (Edgewood Arsenal Chemical Div Rept 262) Apr 1923. 6 p. Price: Microfilm - 50¢ - Photostat - $1.00
This report gives the history, properties and experimental data of fluorobenzene, which was prepared as a possible insecticide, by diazotizing aniline in the presence of sulfuric acid and treating the resulting diazo benzene sulfate with hydrofluoric acid. The fluorobenzene was then isolated from the reaction mixture by steam distillation and purified by straight distillation.

Plastics and Plasticizers

German

PB 16381. I. G. FARBENINDUSTRIE. Anmeldung nr. 582/83, 1940. Ergänzende versuche für die zusatzanmeldung (Application nr. 582/83, 1940. Supplementary examples for an amendment) Feb - Mar 1941. 4 p. Price: Microfilm-50¢ - Photostat-$1.00
The information given apparently is for incorporation within a patent application and covers additons to natural latex and of Oppanol B-dispersion of various sodium salts. In German.

PB 16377. I. G. FARBENINDUSTRIE. Correspondence on patents and patent applications regarding Opannol and its use. (Enlargement print of part of microfilm 182-6) Oct 1933 - Sept 1939. 63 p. Price: Microfilm-$1.00 Photostat-$5.00
Letters and memos directed to the firm's patent department discussing interpretation of claims made in patent specifications regarding Oppanol and its products. In many cases the technical advisers of the various departments doubt that foreign inventions in the same field would be patentable in Germany. In some of the letters questions are raised as to the advisability of defining more closely former I.G. claims in new applications. In German.

PB 17345. I. G. FARBENINDUSTRIE. Dichtung des brunnens am Runden Platz in Berlin/Oppanol-folien (Packing for the fountains in Runden Platz, Berlin/Oppanol-sheets) (Enlargement print of part of microfilm 180-2) May - Jun 1941. 7 p. Price: Microfilm-50¢ - Photostat-$1.00
This material consists of correspondence between the Berlin construction inspection office and the I.G. Farbenindustrie. It was decided to use Oppanol (polyisobutylene) and the relative advantages of Oppanol C and ORO were weighed. The flexibility, resistance to heat, cold, ozone, and lime water were very good. The solubility of Oppanol in certain organic solvents was a distinct disadvantage. Oppanol was recommended for the waterproofing when used with rigid supporting under layers.

PB 17268. I. G. FARBENINDUSTRIE. Emulsion CVW 42; Nr. 46. (Enlargement print of part of microfilm) n.d. 2 p. Price: Microfilm-50¢ - Photostat-$1.00
The emulsion has a solids content of about 58%, is slightly ammoniacal, and comparatively watery. It can be added to other ammoniacal emulsions, or to acid emulsions, the latter having first been made slightly ammoniacal. Solution of salts cause it to precipitate. Application is as an adhesive in the paper, textile, and leather industries. In German.

PB 17285. I. G. FARBENINDUSTRIE. Emulsion MV1; Nr. Nr. 10. (Enlargement print of part of microfilm 180-3) Jun 1938. 3 p. Price: Microfilm-50¢ - Photostat-$1.00
MV1 is a synthetic, watery acid emulsion with a solids content of about 50%. It is free from plasticizers and solvents. MV1 films are fast to light, resistant to action of heat, air oxygen, oils and gasoline. The emulsion can be thinned with water. For plasticizing the following softeners are used: Palatinol C, L, and HS, tricresyl phosphate C II S or Cetamoll Qu. MV1 is miscible with the synthetic emulsions LJ350, LJ400, and LJ450 as well as with natural and Buna latices in any ratio, resulting in softer and more elastic films. Only larger amounts of salts precipitate the very stable emulsion. In German.

PB 17288. I. G. FARBENINDUSTRIE. Herstellung von faserleder unter verwendung synthetischer emulsionsbindemittel, (9,9a) (Manufacture of fibrous leather by using synthetic emulsion binders, (9,9a). (Enlargement print of part of microfilm 180-3) Aug-May 1938. 19 p. Price-Microfilm-50¢ - Photostat-$2.00
By fibrous leather is meant a group of leather substitutes consisting mainly of materials reduced to fibers, especially leather material, which is matted and cemented by the use of an emulsion binder. The properties of the finished product depend 1 - on the nature of the filler (leather, textile, or paper fibers), 2 - on the type of binder (emulsion MV1 furnishes a hard film, emulsion LJ400 a flexible one, emulsion LJ450 a highly flexible one), 3 - on the ratio of filler to binder, and 4 - on the method of production.

PB 16331. I. G. FARBENINDUSTRIE. Herstellung von kautschukartigen mischpolymerisaten des isoprens. (Manufacture of rubber-like mixed polymers of isoprene). (Enlargement print of part of microfilm 182-5) Feb, Mar 1942. 12 p. Price: Microfilm-50¢ - Photostat-$1.00
Mixed polymers of isoprene, vinyl-ethynyl-carbinol, and acrylonitrile or methacrylonitrile can be more quickly polymerized than vinyl-ethynyl-carbinol with butadiene or isoprene alone. Fillers and pigment can be added to these mixed polymers. These documents constitute an intended patent application. In German.

PB 16353. I. G. FARBENINDUSTRIE. Kunststoff-graphitmischungen (Synthetic plastic-graphite mixtures) (Enlargement print of part of microfilm 182-5) Oct 1938 - Apr 1939. 7 p. Price: Microfilm-50¢ - Photostat-$1.00
These documents are correspondence from the I. G. nitrogen division to their patent division regarding the proposed patenting of polyisobutylene (Oppanol) and polyvinylisobutyl ether compounds to which have been added carbon black and graphite. The report discusses some of the properties of these mixtures and also refers to "ORO Folie" which is Oppanol-carbon black -graphite film. See also PB 16352.

PB 17286. I. G. FARBENINDUSTRIE. Oppanol C; Nr. 3. (Enlargement print of part of microfilm 180-3) Aug 1938. 3 p. Price: Microfilm-50¢ - Photostat-$1.00
Oppanol C is a thermoplastic, non-vulcanizable synthetic material which in regard to softness, flexibility, and elasticity resembles natural rubber. It is almost color - and odorless, very extensible and has a good tensile strength. Other of its properties are given. With or without fillers it can be applied in the paper - textile -, rubber -, oil cloth -, and artificial leather industry. In German.

PB 18295. I. G. FARBENINDUSTRIE. Perduren SP: Ein wetter- und quellbeständiges perduren in form einer wässrigen suspension. (Perduren SP, a weather- and swell proof perduren in form of a watery suspension). (Enlargement print of part of microfilm 185-2) n. d. 6 p.
Price: Microfilm-50¢ - Photostat-$1.00
This report consists of a factory publication regarding a newly developed synthetic latex. Perduren SP is said to be suitable for use, in many cases, in place of rubber latex and have the advantages of excellent swell-resistance against gasoline and mineral oils. Artificial aging tests have shown that this material is very stable. It can be stored as a suspension in paste consistency and is applied on a fabric by brush after being duly prepared. It is vulcanized at 130°C for 80-100 minutes. In German.

PB 16352. I. G. FARBENINDUSTRIE. Polyisobutylen enthaltende massen (Polyisobutylene compounds). (Enlargement print of part of microfilm 182-5) May 1939. 7 p.
Price: Microfilm-50¢ - Photostat-$1.00
This document is concerned with the priority of French patent application 38084, dated Nov. 21, 1938. It is stated that mixtures of polyisobutylene of molecular weights of 100,000 or 200,000 and higher and which are composed of carbon black and graphite display distinct and individual properties different from isobutylene compounds containing only carbon black or graphite alone. The properties and advantages of polyisobutylene-carbon black-graphite mixtures are discussed and the results of tests are presented. See also PB 16353.

PB 17348. I. G. FARBENINDUSTRIE. Prüfbedingungen für oppanol-abdichtungsbahnen (Test conditions for Oppanol-sealing sheets). (Enlargement print of part of microfilm 180-2) Jan 1942. 7 p. Price: Microfilm-50¢ - Photostat-$1.00
This letter to the central office of the German Railways encloses a list of the properties of strips or sheets made of Oppanol; also attached is a sketch of the test piece used in tests. In German.

PB 16332. I. G. FARBENINDUSTRIE. Ueber die desaktivierende wirkung des sauerstoffs bei der emulsionspolymerisation von vinylverbindungen. (Patentzusammenstellung) (On the disactivating effect of oxygen in the emulsion polymerization of vinyl compounds - List of patents). (Enlargement print of part of microfilm 182-5) Feb 1941. 4 p.
Price: Microfilm-50¢ - Photostat-$1.00
A listing of the contents of foreign and German patents on the following topics: Elimination of atmospheric oxygen by indifferent gases (N_2, CO_2) in performing the emulsion polymerization, addition of organic and inorganic reducing agents, and gradual addition of per-compounds which are used as activators. In German.

PB 16378. I. G. FARBENINDUSTRIE. Verfahren zur herstellung von kautschukartigen polymerisationsprodukten (Method for production of rubber-like polymerization products) (Enlargement print of part of microfilm 182-6) Apr 1937-Feb 1940. 15 p. Price: Microfilm-50¢ - Photostat-$1.00
Correspondence regarding a patent additional to the main patent, applied for under I.56 944 IVc/39 b. Characteristic is the polymerization of vinylcarbazole in the presence of polymeric isobutylene. In German.

PB 16358. I. G. FARBENINDUSTRIE. Verfahren zur herstellung von wässrigen polyäthylen dispersionen (Method of preparing agneous dispersions of poly ethylene). (Enlargement print of part of microfilm 182-6) Jul 1941. 9 p. Price: Microfilm-50¢ - Photostat-$1.00
Polymeric ethylene is fused with soaps of oxydation products of paraffin hydrocarbons of high molecular weight. In the molten state this mixture is neutralised with diluted lye, and later hot water is added with very vigorous stirring. The dispersions are liquid to pasty products. Such polyethylene dispersions or their mixtures with other dispersions of artificial materials can be used as coatings on paper, textiles, leather, wood, stones and metals, or as binders in the manufacture of fibrous leather, etc. This report was apparently written up for a patent application. In German.

PB 16383. I. G. FARBENINDUSTRIE. Verfahren zur stabilisierung von wässrigen polyisobutylen-dispersionen (Method for stabilization of aqueous polyisobutylene dispersions). (Enlargement print of part of microfilm 182-6) Nov - Dec 1940. 11 p. Price: Microfilm-50¢ - Photostat-$1.00
Addition of 0.5 - 1% of inorganic or organic, neutral or alkaline reactive salts of alkali metals or their hydroxyl compounds to polyisobutylene dispersions improve their stability. These dispersions can be used for impregnation and doubling of fabrics, for all kinds of coatings on paper, wood, masonry, and metals, as binder for fibrous leather, and as adhesive. In German.

PB 17260. VERKAUFSGESELLSCHAFT FÜR KUNSTSTOFFERZEUGNISSE M.B.H. FRANKFURT. Röhre, folien, tafeln, und platten aus "Igelit"; Merkblatt A1. (Tubes, foils, sheets, and plates made from "Igelit"). (Enlargement print of part of microfilm 180-3) Jan 1939. 4 p. Price: Microfilm-50¢ - Photostat-$1.00
This is an advertising leaflet of the above concern. Igelit is the provisional name for a thermoplastic polymer. Igelit products are non-inflammable, odorless, tasteless, physiologically unobjectionable, water, acid, and alkali proof. They can be widely used as building materials in the chemicalindustry, and for linings in containers in the food and textile industry. In German.

PB 19269. WOOD, W. L. Vinyl chloride, polyvinyl chloride, chlorinated polyvinyl chloride, and bristles, cane and fibres. I. G. Farbenindustrie, Leipzig area. (BIOS Final Rept 104, Item 22) Jan 1946. 37 p.
Price: Microfilm - 50¢ - Photostat - $3.00
This report describes the following: The plant apparatus, raw material, process, and uses of monomeric vinyl chloride at Schkopau; the continuous polymerization of vinyl chloride at Schkopau; the batch polymerization of vinyl chloride at Bitterfeld; chlorinated polyvinyl chloride at Bitterfeld; polyvinyl chloride synthetic bristles and cane at Wolfen; and chlorinated polyvinyl chloride filament and staple fiber at Wolfen. Flow sheets and photographs for the above processes are shown.

United States

PB 21838. U. S. WAR DEPARTMENT. QUARTERMASTER BOARD. Report of test of covers, protective, individual: Effect of pinholes, chips, and coating adhesion on durability of cover. QMBT-1300. (Project T-339) Nov 1943. 12 p.
Price: Microfilm-50¢ - Photostat-$1.00
Procedure and findings of tests are described. Principal findings relative to the durability and location of failures of 17 types of covers tested are presented in tabular form. It is recommended that with respect to durability: 1 - covers of the special high coating adhesion type, 1061-1400, be considered superior to all other types tested; 2 - that low coating adhesion be considered a serious weakness in a cover; 3 - that large coating chips of the size present in type 6 covers be considered a serious weakness; and that visible holes be considered a serious fabric weakness.

Paints, Varnishes and Lacquers

PB 3863. KOUNTZ, R. R. Air-drying (pentamethylene fulvin) lacquers. (CWS Tech Intelligence Div Rept 5) Oct 1945. 2 p. Price: Microfilm-50¢ - Photostat-$1.00
Interrogation of Dr. Willi Mertens of Wernerwerke Elektrochemie, Siemens and Halske regarding the reaction of one mole of 1,3-cyclopentadiene with one mole of any hydrophobic ketone (or aldehyde), using a saturated solution of potassium hydroxide in an inert atmosphere of nitrogen. The reaction with cyclohexanone is described, the final product being a mixture of the polymers of pentamethylene fulvin. The lacquer thus prepared requires a retarding substance to promote slower drying, and for this purpose an unsaturated mineral oil and polybutadiene are added. The lacquer coating can be made highly flexible by baking for thirty minutes at 300°C.

PB 25315. U. S. AERONAUTICAL BOARD. Coatings: protective, organic (for aircraft); general specifications (methods for sampling and testing), and amendment 4, dated Nov 27, 1944. (Army-Navy Aeronautical Specification AN-TT-C-516) Jul 14, 1941. 87 p. Price: Microfilm-$1.00 - Photostat-$6.00
This is a general specification which describes methods for the inspecting, test reporting and sampling of organic protective coatings for aircraft. The contractor's responsibility and procedure for the submission of qualification samples, information on submission of ingredient and product material samples and test data, the size and number of samples to be made for the procuring agency, and the examination of the samples, are explained in detail. Examples of the revised forms to be filled out are given in the amendment. Section C gives specifications for analyses and tests. Included are the preliminary requirements and preparations, such as the preparation of test panels of various materials, and the examination of materials, general analytical tests of materials, physical properties of cast and coated films, resistance properties, analytical tests of oil base and cellulose base materials, of volatile ingredients, oils, pigments, celluloses, reagents, and standards by color scale requirements. Specifications for labelling, packaging, packing and marking are given.

Inorganic Chemicals

PB 19685. DOLE, R. W. Submarine escape apparatus-German- chemical analysis. Jun 1943. 3 p.
Price: Microfilm-50¢ - Photostat-$1.00
The report describes a German escape canister for the absorption of carbon dioxide gas. The canister is good for one half hour which is like other German canisters previously tested. The absorbent of the German canister is soda lime (caustic soda, slaked lime, and water) and is packed in one layer. The canister tested had a very simple design and although it was not as efficient as the Navy's, still compared favorably with it. Diagram of German canister is attached. This communication is from the Naval Research Laboratory.

PB 24928. I. G. FARBENINDUSTRIE. Drawings of: sodium hypochlorite flow sheet; plan of building 214;7 meter mercury cell; 9 KA switch. (TIIB, Misc Chemicals File 202-210, 214, 215 a-v) 1946. 164 p. Price: Microfilm-$2.00 - Photostat-$11.00
These drawings are of the I. G. Farben 7 meter horizontal mercury cell chlorine plant at Höchst. Included are a diagrammatic flow chart of equipment of the entire process, a building plan, detail drawings of individual pieces of equipment such as a nine kiloampere switch for the electrolysis current, an alarm cutout, a mercury pump (rated capacity not given), layout of cell and decomposer. Lists of material, translated into English accompany some of the detail drawings. Most of the special electrical equipment is listed as products of Voight and Haeffner A. G., Frankfurt. For chlorine storage at this plant, two 60 ton and six 13 ton tanks were placed in a bomb proof shelter which was supplied with compressed air by single stage compressors from another portion of the operation. The flow sheet is labeled "Chlornatron". This translated means sodium hypochlorite, a bleach liquor which is the final product of the plant. The drawings were all prepared by the U. S. Industrial Chlorine Commission.

PB 24930. I. G. FARBENINDUSTRIE. Operating data and costs of I. G. Farbenindustrie A. G. chlorine plants. (TIIB, Misc Chemicals File 247) 1939-1944. 90 p.
Price: Microfilm-$1.00 - Photostat-$6.00
This document comprises the cost accounting sheets of I. G. Farben's chlorine and chlorine by-products manufacture at all their plants. The dates covered vary from 1939 to 1944.

PB 20602. SMITH, CLAUDE H. Development of a plant process for making silica gel. (Edgewood Arsenal Chemical Div Rept 68) Aug 1921. 29 p. Price: Microfilm-50¢ - Photostat-$2.00
The purposes of the investigation were to produce silica gel on a semi-works scale and to develop methods of manufacture. It was found possible to manufacture a silica gel on a semi-works scale, equal in all respects to that purchased on the open market at a cost much less than the market price. No great difficulties were met within the process as developed. Theoretical and experimental data are given, also, conclusions and recommendations with tables, graphs, and diagrams.

Ordnance Chemicals

German

PB 16728. EPPIG, HENRY J. The chemical compositions of German pyrotechnic smoke signals. (File XXXII-58, Items 3, 7, and 17) 1945. 30 p. Price: Microfilm-50¢ - Photostat-$2.00
It is shown that the colored smoke compositions were mixtures of organic dyestuffs, potassium chlorate, kieselguhr and lactose, which were granulated by means of water and a water soluble binder. These compositions are given in detail. The chemical formulae of the organic dyestuffs used were obtained from the I. G. Farbenindustrie and are given in the appendix. The white smoke compositions were found to be either phosphorus phlegmatized with ten per cent of paraffin, or mixtures of hexachlorethane with zinc dust. Two different types of black smoke compositions were found and their formulae are given. Photographs of molds and mixing equipment are included.

PB 16669. HUTTING, LEE. High explosives: The development and manufacture of hexogen in Germany. Fourth partial report. (CIOS Progress Rept 24) Jun 1945. 5 p. Microfilm-50¢ - Photostat-$1.00
Reports on methods of production of: W-Salz, or Weiss Salz; B-Salz; K-Salz; KA-Salz; and Sh-Salz. Although the plant of Dynamit A.G. at Krümmel is especially mentioned, also mentioned are factories at Christianstadt, Döberitz, Bobingen, and Klenig.

PB 16670. PRATT, CARL D. Dynamit A.G., Krümmel, Germany. (CIOS Ordnance Target Rept 21) Jun 1945. 4 p. Price: Microfilm-50¢ - Photostat-$1.00
Status is given of hexogen and diethylene glycol dinitrate developments in Germany, specifically of developments at Krümmel. Also considered are other liquid nitric esters, PETN, TNT and nitrocellulose. See also PB 16666, under Schneider, and PB 16669, under Hutting, Lee.

PB 16666. SCHNEIDER. Propellants: Nitrocellulose manufacture at the Krümmel Plant of Dynamit A.G. Fifth partial report. (CIOS Progress Rept 39) 1945. 6 p.
Price: Microfilm-50¢ - Photostat-$1.00
The statement includes the following: cellulose pretreatment, preparation of nitrating acid, nitration, stabilization, pressure boiling, hollandors and retting, final stabilization, mixing, grit removal, removal of water, and waste water clarification. This is a translation of the text of Mr. Schneider, who was in charge of nitrocellulose manufacture.

PB 16665. SCHNURR, WALTHER. High explosives: Manufacture of nitroguanidine. Ninth partial report. (CIOS Progress Rept 38) May 1945. 2 p. Price: Microfilm-50¢ - Photostat-$1.00
This is a translation of a written description of the process for the manufacture of nitroguanidine as carried out by Dynamit A. G. The statement was prepared by Dr. Walther Schnurr, a director of Dynamit A.G., Christianstadt.

Italian

PB 20655. MACY, RUDOLPH and WEAVER, ALFRED B. Captured Italian phenyldichlorarsine-mustard mixture. (C#S Foreign Materiel Tech Rept ME) Sep 1944. 5 p. Price: Microfilm - 50¢ - Photostat - $1.00
This is a report of captured materiel previously reported in the N.D.R.C. Informal Report No. 9-4-1-17, dated June 10, 1944, pages 29 and 30. The mixture contained approximately 50% mustard gas (H) and 50% phenyldichlorarsine (PD); its chemical and pressure stabilities and vesicant action are also recorded.

United States

PB 20701. BLODGETT, W. A. Condensation or carbazol with arsenic trichloride. (Edgewood Arsenal Chemical Div Rept 153) May 1922. 2 p. Price: Microfilm - 50¢ - Photostat - $1.00
An attempt was made to obtain a chlorarsine derivative by treating carbazol, a secondary amine and weak base, with arsenic trichloride, similar to the way in which diphenylamine yields diphenylaminechlorarsine. This attempted condensation between both carbazol and potassium carbazol and arsenic trichloride yielded no reactions.

PB 4202. COLEMAN, GEORGE H. and others. Preparation and stability of the nitrogen mustards. (OSRD Rept 3551). Apr 1944. 14 p. Price: Microfilm-50¢ - Photostat-$1.00
This is a progress report on the preparation and stability of nitrogen mustards at the State University of Iowa, for the period, June 21, 1943 to January 8, 1944. For the past several years considerable interest has been shown in the nitrogen mustards as chemical warfare agents. This report describes the preparation of twelve such compounds: Di-(β-chloroethyl) furfurylamine; Di-(β-chloroethyl) tetrahydrofurfurylamine; β - [Di-(β-chloroethyl) amino] propionitrile; Di-(β-chloroethyl) -β- methoxyethylamine; Bis- [β-(di-(β-chloroethyl) amino) ethyl] sulfide; Tri-(chloromethyl) -N, N-di-(β-chloroethyl) aminomethane; 4-β-chloroethylmorpholine; Di-(β-chloroethyl) allylamine hydrochloride; Di-(β-thiocyanoethyl) methylamine; Ethyl-di-(β-chloroethyl) carbamoxyethylammonium chloride; Di-(β-hydroxyethyl)-n-propylamine; Di-(β-hydroxy-n-propyl) methylamine. The most stable of the compounds listed was found to be tri-(chloromethyl)-N, N-di-(β-chloroethyl) aminomethane. A table gives the stability of these compounds at 60°C.

PB 20599. DEARBORN, F. E. The substitution of aluminum for magnesium in ephorite. (Edgewood Arsenal Chemical Div Rept 96) Dec 1921. 28 p. Price: Microfilm - 50¢ - Photostat - $2.00
The term ephorite is applied to a mechanical mixture of magnesium metal with an oxidizing agent, such as a chlorate or perchlorate, which when ignited burns rapidly, producing intense heat and a sufficient amount of gas to cause high pressures to be developed when confined. Experimental work is recorded, the major conclusion being that aluminum metal prepared by grinding aluminum foil in oil or by the blast furnace may be substituted for magnesium. Considerations are given to substitution in thermite and white phosphorus bombs. A drawing is attached of the ignition temperature apparatus used in the tests.

PB 20617. GROESBECK, WILLIAM M. Report of chemical warfare service cooperation in the anti-rat campaign for suppression of bubonic plague in Porto Rico. (Edgewood Arsenal Chemical Div Rept 37) n.d. 12 p. Price: Microfilm - 50¢ - Photostat - $1.00
The use of phosgene insofar as it was found practical to use the gas was considered a success. It was clearly demonstrated that the use of a toxic gas as a rat eradicative measure is greatly attenuated by the attendant danger to human life. Isolated areas lend themselves readily to this means of rat killing. Prior to gassing, the populated areas must be evacuated of all animal life, which it is desired to preserve. This makes the use of a toxic gas impractical in direct proportions to the density of population in any given area.

PB 20628. HINE, T.B. Some measurements of a smoke screen at sea. (Edgewood Arsenal Chemical Div Rept 234) Dec 1922. 8 p. Price: Microfilm - 50¢ - Photostat - $1.00
Some measurements of the height and width of a smoke screen from two destroyers at sea are recorded. Suggestions of precautions to be taken in collection of future data of this sort in order to obtain greater accuracy are made on the basis of experiences of this test.

PB 20607. HUMISTON, BURR. Viscosity, surface tension and density of chlorvinyldichlorarsine, MI and dichlordiethylsulphide, MO. (Edgewood Arsenal Chemical Div Rept 60; Physical Dept Rept 3) Aug 1921. 23 p. Price: Microfilm-50¢ - Photostat-$2.00
This report gives the results obtained and experimental data in determining the viscosity, surface tension, and density of pure chlorvinyldichlorarsine (MI) and dichlordiethylsulfide (MO) with tables and diagrams.

PB 6543. KHARASCH, M. S. Possible toxic agents and intermediates: Progress rept to Dec 14, 1942. (OSRD Rept 1284) Mar 1943. 25 p. Price: Microfilm-50¢ - Photostat-$2.00
This report deals with methods of preparing a large number of beta-chloroethylamino derivatives and the intermediates involved in their synthesis. Aromatic, aliphatic, and heterocyclic types have been studied. Other possible toxic compounds and the preparation of some of these is described. In all, 32 compounds are described in this paper as possible toxic chemical warfare agents.

PB 20611. KLOSKY, SIMON and STRICKER, PAUL F. A critical study of the physico chemical constants of phosgene. (Edgewood Arsenal Chemical Div Rept 55; Physical Dept Rept 4) Jun 1921. 47 p. Price: Microfilm - 50¢ - Photostat - $4.00
Summary of values recommended as a result of this investigation are: Table of vapor pressures at various temperatures, boiling point, density, coefficient of expansion, percentage dissociation at various temperatures, latent heat of vaporization at boiling point, heat of formation, heat of reaction, specific heat of liquid, heat of combustion, refractive index, and surface tension. Doubtful values are: Heat of solution, specific heat of vapor and melting point. Tables and graphs are included.

PB 20606. KLOSKY, SIMON and STRICKER, PAUL F. The physico chemical constants of brombenzylcyanide. (Edgewood Arsenal Chemical Div Rept 64; Physical Dept Rept 14) Aug 1921. 17 p. Price: Microfilm-50¢ - Photostat-$2.00
This report gives vapor pressure, density, specific volume, coefficient of expansion, latent heat of vaporization, heat of formation, and heat of reaction for brombenzylcyanide. Tables, graphs, and bibliography are included.

PB 20608. KLOSKY, SIMON and STRICKER, PAUL F. Physico chemical constants of diphenylaminochlorarsine. (Edgewood Arsenal Chemical Div Rept 58; Physical Dept Rept 7) Jul 1921. 16 p. Price: Microfilm - 50¢ - Photostat - $2.00
This report records the results of investigations into the vapor pressure, density and thermochemical data of diphenylaminochlorarsine, commonly known as "DM" or adamsite. Bibliography and graph are included.

PB 20730. MESCHTER, H. F. Preparation of mercury dimethyl. (Edgewood Arsenal Chemical Div Rept 192) Jun 1922. 3 p. Price: Microfilm - 50¢ - Photostat - $1.00
This material, an intermediate in the preparation of methyldifluorarsine, was prepared by the action of methyl iodide on sodium amalgam. The material obtained had a boiling range of 90-96°C., the greater portion distilling at 93-95°C. The yield was 26% of theory, based on the methyl iodide used. This product, which distilled at 90-96°C., the greater part coming over at 93-95°C., gave a lethal concentration of over 8.32 mg/l. A concentration of 0.05 mg/l. in a closed chamber did not give any positive results in the man tests. The material is apparently of no interest as a toxic.

PB 20700. REED, A. B. Organic fluorine compounds. (Edgewood Arsenal Chemical Div Rept 151) May 1922. 12 p. Price: Microfilm - 50¢ - Photostat - $1.00
Attempts were made to substitute fluorine in such toxic halogen compounds as chlorpicrin brompicrin, dinitrotetrachlorethane and trichloracetonitrile by the action of antimony trifluoride, antimony trifluoride dibromide, mercuric fluoride and silver fluoride. The reactions were not successful since none of the above compounds were acted upon by the fluorides and the work was therefore discontinued. The methods of preparation of antimony trifluoride, silver fluoride, mercuric fluoride, brompicrin and trichloracetonitrile are described.

PB 19864. REEVES, ARTHUR M. Separation of constituents of surplus and rejected HC smoke mix. (CWS Tech Div Memo Rept 1225) Jan 1946. 17 p. Price: Microfilm - 50¢ - Photostat - $2.00
The object of the work was to investigate several methods for the reclamation of the constituents of HC smoke mix from surplus smoke pots and from rejected lots of HC smoke mix. The smoke mix contained approximately 46% hexachlorethane (HCE), 48% zinc oxide and 6% aluminum. Since both hexachlorethane and zinc chloride have been used for the preservation and flame and insect proofing of wood, it was suggested that research be undertaken to determine the value of HC mix for treating wood. Three methods for the removal of the HCE were tried: (1) Solvent extraction requiring one pound of solvent for each pound of HCE recovered, (2) sublimation which was simple but its plant-size operation would create a fire hazard, (3) steam distillation with 5% H_2SO_4 which was considered the most practical. After the HCE was removed, the seperation of the zinc oxide and aluminum was considered: (1) Emulsions and flotation were not practical with the small size particles, (2) acid extraction was good, but cost of the acid was excessive, (3) the best method was an alkaline mixture of aqueous Na_2CO_3 and NaOh used to dissolve the aluminum and recover it as Al_2O_3, leaving the insoluble ZnO as a residue. It is recommended that further work be done.

PB 20705. SCRUTON, H. A. and REEVES, A. M. Chloracetophenone derivatives. (Edgewood Arsenal Chemical Div Rept 158) May 1922. 12 p. Price: Microfilm - 50¢ - Photostat - $1.00
The preparation of various derivatives of chloroacetophenone, viz., nitrochloroacetophenone, p-aminochloroacetophenone, p-cyanochloroacetophenone, o-hydroxychloroacetophenone and 2-hydroxy-3-chloro-chloroacetophenone was undertaken in order to determine the effect of substitution of various groups in the benzene ring of chloroacetophenone on its toxicity. The reactions which were tried for the preparation of the nitro, amino and cyano derivatives of chloroacetophenone are all well known reactions. The history, theory, properties and methods of preparation are treated.

PB 20627. SEATON, S. G. Investigation of the reaction between tetrahydrobenzene and arsenic trichloride and sulphur monochloride respectively. (Edgewood Arsenal Chemical Div Rept 250) Feb 1923. 9 p. Price: Microfilm - 50¢ - Photostat - $1.00
The reactions of arsenic trichloride and sulphur monochloride with tetrahydrobenzene were investigated. A reaction appeared to take place with arsenic trichloride, but the products were very unstable and decomposed almost as fast as formed. A reaction took place with sulphur monochloride, but the product could not be isolated by distillation under reduced pressure. The crude reaction product had no vesicant action.

PB 20694. WEST, C. T. The development of the manufacture of arsenic trichloride on a semi-works basis (with supplement No. 1, Manufacture of arsenic trichloride, by R. G. Smith, Nov 1922). (Edgewood Arsenal Chemical Div Rept 91) Apr 1921. 18 p. Price: Microfilm-50¢ - Photostat-$2.00
The purpose of this work was to develop a semi-works method of manufacture for arsenic trichloride from arsenic trioxide and hydrochloric acid, and to secure the necessary data for the design of a large scale manufacturing plant. It was also desired to produce a sufficient amount of this material to manufacture about 10,000 pounds of diphenylaminochlorarsine. The method developed consists of refluxing arsenic trioxide and hydrochloric acid until the reaction is complete and then dehydrating this mixture with concentrated sulphuric acid. The arsenic trichloride separates from the spent acid as a heavy oily liquid, slightly dark in color. Layout of semiworks plant is included. The purpose of the work reported in the supplement was the manufacture of arsenic trichloride of sufficient purity to be suitable for use in the manufacture of Ml. Ml is Lewisite or β-chlorvinyldichlorarsine.

Analytical Chemistry

PB 19862. HUFFMAN, CLARENCE W. and others. Chemical and physical methods for the assessment of insecticide dispersal. (CWS Tech Div Memo Rept 1241) Mar 1946. 33 p. Price: Microfilm-50¢ - Photostat-$3.00
Data is given on methods for assessment of the dispersal of insecticides (particularly DDT). As to estimation of DDT, the chemical nitration method is found to be the best, and Oil Red and Calico Blue are the best dyes to use as tracers. Other considerations are: Dosage per unit area, decomposition of DDT, and particle-size distribution. It is recommended that entomological assessment be made as well. A bibliography and graphs accompany the report.

PB 20506. MITCHELL, JAMES W. and STEVENSON, THOMAS. Volatiles in smokeless powder; First partial report. (Frankford Arsenal Ordnance Lab Rept 67) Nov 1941. 44 p. Price: Microfilm-50¢ - Photostat-$3.00
Test methods have been developed by means of which it has been possible to detect and determine the concentration of several volatile decomposition products of smokeless powders, notably nitrogen oxides and ammonia; and to study conditions under which they are formed. The results show that ammonia is present in the propellant powder of loaded ammunition as ammonium nitrate and increases in concentration with age. Ammonia may also be produced by accelerated aging at elevated temperature in fresh IMR-1185 powder and in fresh nitrocellulose. The formation of nitrite and nitrate salts generally accompanies the decomposition of stored powder and it has been found that the occurrence of large quantities of nitrates is usually associated with a tendency to season cracking of the brass cartridge. Other experiments on the sublimation of ammonium nitrate and the role of powdered tin in accelerating the formation of ammonia in nitrocellulose are reported. As accompaniments there are included tables, diagrams and photograph.

ELECTRICAL MACHINERY, EQUIPMENT, AND SUPPLIES

Communication Equipment

German

PB 19754. ALLIED FORCE HEADQUARTERS. SIGNAL SECTION. 849TH SIGNAL INTELLIGENCE SERVICE. German Deci-Meter radio set, DMG 5 K. Aug 1943. 21 p. Price: Microfilm - 50¢ - Photostat - $2.00
This set was captured near Palermo in Sicily by American forces. It was found installed on a mountain of 1500-2000 feet, at what was evidently a relay point. The equipment was partially destroyed. This is a low-powered transmitter and receiver used to provide multi-channel communication including voice, code and teletype over a limited distance. Relay stations may be located at intermediate points to extend the working distance. The frequency range is 500-600 mc. Power output is believed to be 0.5 to 1.0 watts. Directional antennas consisting of two rows of four dipoles each are used giving an extremely narrow beam. Appendix contains an edited translation of the instruction manual for the German Deci-Meter radio set DMG 4K (an earlier model of this set, photographs of the DMG 5K and a dimensioned drawing of the antenna array.

PB 19750. ALLIED FORCE HEADQUARTERS. SIGNAL SECTION. 849TH SIGNAL INTELLIGENCE SERVICE. German radio receiver, Tornister E.b. Jun 1943. 14 p. Price: Microfilm-50¢ - Photostat - $1.00
The Torn E.b. is a general purpose receiver which had a wide distribution in the German army. It was issued separately for use in intercept work, and was also used in conjunction with several direction finders and transmitters. The set examined was captured on the Tunisian front together with descriptive literature. The pack receiver is a portable, tuned radio frequency, four-tube receiver having a frequency range of 97 to 6970 kc, divided into 8 bands. The apparatus can receive cw telegraphy (A1), tone telegraphy (A2), and telephony (A3). The receiver and the requisite batteries and accessories comprise two separate half-packs which can be carried by one man. Photographs, list of components, and circuit and schematic diagrams are included.

PB 19753. ALLIED FORCE HEADQUARTERS. SIGNAL SECTION. 849TH SIGNAL INTELLIGENCE SERVICE. German radio set, five-watt sender, "5W. S./24b-104". Jul 1943. 10 p. Price: Microfilm - 50¢ - Photostat - $1.00
The 5 watt sender is a medium frequency transmitter used in divisional and regimental nets of the German army. This captured set was manufactured by Seibt in 1937. It can be used both as a ground and as a mobile station. It has a frequency range in four bands from 950 to 3150 kc, and has a telegraphy power output of 5-7 watts. The power supply is by pedal generator, motor car storage battery and dynamotor, or gasoline motor generator. The range is 10 miles for telephony or 35 miles for telegraphy. The report includes photographs, a panel sketch, parts list and circuit diagram.

PB 19752. ALLIED FORCE HEADQUARTERS. SIGNAL SECTION. 849TH SIGNAL INTELLIGENCE SERVICE. German radio set, Tornister Funkgerät d2. Jul 1943. 15 p. Price: Microfilm - 50¢ - Photostat - $1.00
The German radio set on which this report is based was captured by American forces in the closing phases of the Tunisian campaign. It was widely used by infantry units for tactical communication. It is a small, portable transmitter-receiver carried in two packs, consisting of a three stage transmitter and a six-tube superheterodyne receiver. Type A1, A2, and A3 signals can be received; transmission is of types A1 and A2 only. The frequency range is 33.8 to 38.0 mc. Power output is one watt. Included in the report are a front panel sketch, photographs, parts list and circuit diagrams.

PB 18442. GERMANY. ELEKTROTECHNISCHES VERSUCHSAMT DER REICHSBAHN. Bericht A 1 G/1945 über schutz der fernleitungen gegen feindangriffe. (Report A 1 G/1945 on protection of high-tension power lines against enemy attack). (ALSOS Mission, EFR 302 c) Jan 1945. 4 p. Price: Microfilm-50¢ - Photostat-$1.00
High-tension lines supplying power for armaments and communications are particularly exposed to enemy attack because they extend long distances over thinly populated places and sections of hostile people. It was decided that the poles supporting the power-lines were most exposed to attack. This report in German by the electrotechnical experiment station of the state railway discusses ways and means of protecting them.

PB 8522. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Schaltungsanordnung für ein mit einer oder mehreren verstärkerröhren zusammengebautes mikrophon, insbesondere kondensatormikrophon. (A hook-up arrangement for one or more amplifying tubes built together with a microphone especially a condenser microphone.) German patent 730243 applied for Oct 28, 1939 with number T52990 VIII a/21a2. Original inventor:Gerlach. 1939. 13 p. Price: Microfilm-50¢ - Photostat-$1.00

PB 8671. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Schaltungsanordnung zur überwachung und/oder zur regelung von doppelton-telegrafieempfangsanlagen. (A circuit arrangement for the control and/or regulation of a double tone telegraph receiving systems). German patent 737891 applied for Jul 2, 1940 with number T53940 VIII a/21a1. Original inventor: Linke. 1940. 7 p. Price: Microfilm-50¢ - Photostat-$1.00

PB 8639. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Überlagerungsempfänger mit selbsttätiger schwundregelung. (A super heterodyne receiver with an automatic volume control). German patent 737872 applied for Apr 20, 1940 with number T53673 VIII a/21a4. Original inventors:Kotowski and others. 1940. 12 p. Price: Microfilm-50¢ - Photostat-$1.00

PB 20330. U. S. WAR DEPARTMENT. SIGNAL CORPS. German Fusprech sets, funksprechgeräte a, d, and f. (Allied Forces Enemy Equipment Intelligence Service Rept 47) Aug 1944. 18 p. Price: Microfilm-50¢ - Photostat-$2.00
The Funksprechgeräte a, d, and f are small battery-powered radio transmitter-receivers designed for vehicular operation. The sets operate in the upper HF and lower VHF bands where radiation is nearly line-of-sight. They are probably used for inter-vehicular reconnaissance communication in light armored vehicles. Photographs, parts lists and circuit diagrams included.

PB 20323. U. S. WAR DEPARTMENT. SIGNAL CORPS. German 10 line 10 drop switchboard. (Allied Forces Enemy Equipment Intelligence Service Rept 33) Mar 1944. 7 p. Price: Microfilm-50¢ - Photostat-$1.00
The German 10 line 10 drop switchboard is a portable, monocord, magneto-telephone switchboard for use primarily with local-battery field wire systems, probably used as a battalion, or a regimental, telephone central. Photographs and a circuit diagram are appended.

Italian

PB 19751. ALLIED FORCE HEADQUARTERS. SIGNAL SECTION. 849TH SIGNAL INTELLIGENCE SERVICE. Italian radio set, RF1-CA. Jul 1943. 12 p. Price: Microfilm - 50¢ - Photostat - $1.00
This report is a supplement to PB 19748, which covered only the transmitter-receiver component of this equipment. Acquisition of the manual of instructions and the remainder

of the equipment except for batteries makes possible a more complete study. The RFL-CA is designed for use in tanks, armored cars and automobiles, and can also be set up as a ground installation. The set is generally used in nets of four with all other stations in the net aligning themselves on the net control station. The transmitter is rated at 8 watts output, with frequency range from 27,000 to 33,600 kc. Transmission is of types A-2 and A-3. Report includes circuit diagram, photographs of the power unit and a sketch of a typical tank installation.

PB 20322. U. S. WAR DEPARTMENT. SIGNAL CORPS. Italian air force telephone. (Allied Forces Enemy Equipment Intelligence Service Rept 32) Mar 1944. 7 p. Price: Microfilm-50¢ - Photostat-$1.00
This telephone is a local-battery field telephone with provision for operation as a telegraph set. It compares favorably with Telephone EE-8- ( ) and can be used in place of it on local-battery systems. Some features mentioned, such as the line-conductor connecting devices and the telegraph unit might be worthy of further investigation. Photographs and a circuit diagram are included.

PB 20320. U. S. WAR DEPARTMENT. SIGNAL CORPS. Italian field telephone, model 1942. (Allied Forces Enemy Equipment Intelligence Service Rept 30) Feb 1944. 9 p. Price: Microfilm-50¢ - Photostat-$1.00
This report describes a local battery field telephone comparing favorably with Telephone EE-8-( ) except that it has no provision for switching to common battery operation. It weighs 13 lbs. and has a plastic case. Photographs, a terminal post sketch and circuit diagram are included.

PB 20321. U. S. WAR DEPARTMENT. SIGNAL CORPS. Italian field telephone, Type G. A., Model 1931. (Allied Forces Enemy Equipment Intelligence Service Rept 31) Feb 1944. 8 p. Price: Microfilm-50¢ - Photostat-$1.00
This is a portable telephone of the local battery type, which may be adapted for common battery and automatic system by use of a connector box which may be mounted on top of the case. Compared to Telephone EE-8-( ) it is heavy for field use. Items of interest are the two test circuits, two jacks and the lightning arrestors. Photographs and a circuit diagram are included.

Japanese

PB 19725. SANTILLI, A. Japanese signal equipment: Light-weight headphone driver assembly & throat mike. (U. S. Army Tech Intelligence Center, Tokyo, Rept 1) Dec 1945. 2 p. Price: Microfilm-50¢ - Photostat-$1.00
A recent improvement of driving assembly for Jap conventional "Telefunken" type headphone was found at the Zama Military Academy Signal School, to be used with tank radio. A two section laryngophone was found with the same assembly. Headphone assembly is shown in appended sketch, but sketch of laryngophone assembly is missing.

United States

PB 17981. AUTOMATIC SIGNAL CORPORATION, EAST NORWALK CONNECTICUT. Instruction book, models OAH and OAH-1 code practice equipment. n. d. 22 p. Price: Microfilm - 50¢ - Photostat-$2.00
This code practice equipment was supplied to communication units for the training of telegraph and radiotelegraph operators. The equipment consists of an oscillator-amplifier unit, a distribution unit and accessories and was designed for operation from any of the three following sources of power: a) 100 volt, 60 cycle, single phase, alternating current; b) 100 volt direct current; and c) dry batteries. Included are descriptions of the various parts, instructions for installation, operation, and maintenance, parts lists, a photograph, and wiring diagrams.

PB 17708. BAIRD, W. L. Instructions for installation and operation of Model TDW radio transmitting equipment. (Naval Res Lab RA 52A 337A) Dec 1943. 36 p. Price: Microfilm-50¢ - Photostat-$3.00
This equipment is designed fundamentally for use in the calibration of high frequency direction finders although the design is such as to make it useful as a general utility transmitter where rapidity of frequency changing is desirable, high stability is essential and moderately low power is sufficient. The equipment is semi-portable in nature, is a single unit assembly with two chassis mounted in a common steel cabinet. The upper houses the transmitter proper while the lower unit contains the power unit. This equipment covers a frequency range of 1 to 30 megacycles and is suitable for operating at any frequency within this range. The equipment may be operated either from 115 V, 60 cycle single phase a-c supply line or from a 6 volt storage battery, and is designed for A1 (CW) emission only. The nominal power output is approximately 5 watts varying with frequency throughout the band. Tables, charts, photographs and diagrams are attached to instructions.

PB 18085. COLLINS RADIO COMPANY, CEDAR RAPIDS, IOWA. Instruction book for Navy model TCS-4 radio telephone and telegraph transmitting and receiving equipment; output 40 watts telegraph, output 20 watts telephone, frequency range 1500 kc to 12,000 kc. Mar 19, 1942. 154 p. Price: Microfilm-$2.00 - Photostat-$11.00
The equipment covered by these instructions is a complete radio transmitting and receiving installation and is designed for use in portable and mobile services. The equipment is suitable for installation in trucks, ambulances, motor cars, tanks, motor boats and in other services where severe vibration and shock may be encountered. The transmitter is capable of emitting either CW or voice modulated signals. Installation, adjustment and operation, circuit description, maintenance and service are discussed in this handbook. Appendices give typical performance data, parts lists, color codes, tube data, outline drawings, and schematic diagrams.

PB 17811. COLLINS RADIO COMPANY, CEDAR RAPIDS, IOWA. Instruction book for Navy model TDO radio telephone and telegraph transmitting equipment. Feb 1943. 246 p. Price: Microfilm-$2.50 - Photostat-$17.00
This instruction book contains a general description of the equipment and a description of the circuit with instructions for installation, adjustments, operation, and maintenance of the subject equipment. This equipment is designed for application involving point-to-point communication that requires operation on a number of readily selected frequency channels. The Collins Autotund system permits the selection of any one of ten pre-tuned frequency channels by operating a telephone dial on the transmitter control panel or the dial on the remote control unit panel. The speech amplifier unit contains first and second audio amplifier stages, the audio driver stage, the audio squelch and limiter circuits and the tone oscillator circuit. An auto transformer is provided to permit transmitter operation from either a 115 volt or 230 volt 50/60 cps single phase power source. The equipment is designed for use with 600 ohm sound-powered microphones. The transmitter is capable of operation on any frequency within the range 2000 kc to 18,100 kc. The equipment is designed to work into unbalanced antennas or transmission lines having impedances of from 50 to 1200 ohms with a phase angle of 0 degrees, 70 to 850 ohms with a phase angle of ± 45 degrees or 100 to 600 ohms with a phase angle of ± 60 degrees. The output is 250 watts for MCW, 400 watts for CW or 250 watts for voice. Photographs, schematic diagrams, and drawings illustrate the manual.

PB 17842. COLONIAL RADIO CORPORATION, BUFFALO, N. Y. Instruction book for Navy model ERT-2 ultra-portable ultra-high frequency transmitting-receiving equipment. (IB-7040) Jan 1941. 77 p. Price: Microfilm-$1.00 - Photostat-$6.00
These equipments provide two-way communication by either telephone or MCW telegraphy on any one of 130 different channels throughout the frequency range of 28 to 80 megacycles, with a nominal power output of 0.3 to 0.5 watts. They are

designed for transportation as a knapsack load and may be operated by one man while being carried on his back. The book contains sections on the following subjects: Detailed description; packing, unpacking and transportation instructions; operating and servicing instructions; parts list by symbol designation, and spare parts list. Diagrams and photographs are included.

PB 14282. CROSBY, M. G. Readability of FM, AM and telegraph systems. (OSRD Rept 895-4) Aug 1943. 35 p. Price: Microfilm-50¢ - Photostat-$3.00
A comparison of the relative communication efficiencies of systems of voice-modulated frequency and amplitude modulation and continuous-wave telegraphy. Basis of comparison was that of observed readability. Data was taken and presented in graph form, of the effect of random noise, of critical tuning, of audio limiting and differentiating networks at transmitters, of impulse noise, of continuous wave interference, of audio limiting with C-W interference and of noise effects in absence of limiters. Table is given comparing the relative carrier-noise ratios required to obtain a readability of three. One chart and 18 pages of graphs are given.

PB 19253. DAVIS, T. McL. and TOTH, E. Design of communication receivers for the Naval service with particular consideration to the VHF and UHF ranges. n.d. 26 p. Price: Microfilm-50¢ - Photostat-$2.00
Although dealing primarily with receivers for Naval communications in the VHF and UFH part of the spectrum, the treatment of the subject is generally applicable to any superheterodyne type of receiver in any part of the spectrum where conventional vacuum tubes may be employed. Operational requirements of a typical receiver on a large Naval vessel are considered. The scope of this paper is limited to consideration of the i-f and preselector circuits of the receiver. Graphs and photographs are included.

U.S. Naval Res. Lab

PB 17853. DAVIS, T. M. Instructions for the installation and operation of Model RAC low frequency receiving equipment. (RA 46A 278) Jan 1932. 47 p. Price: Microfilm-50¢ - Photostat-$4.00
This equipment is designed primarily for long distance reception within the frequency range of 12 to 80 kcs. at shore stations. It uses either bilateral or unilateral reception and may be operated directly from any 60 cycle 110 or 220 volt A.C. single phase source which has a comparatively pure wave form. A description of the circuit arrangement, power supply and component parts of the equipment is followed by instructions for installation, operation and testing procedures. Wiring diagrams, drawings and photographs of the equipment are included. The volume was prepared at the U. S. Naval Research Laboratory, Washington, D. C.

PB 17808. FEDERAL TELEPHONE AND RADIO CORPORATION, NEWARK, N. J. Instruction book for Navy Models RBA, RBA-1, RBA-2 and RBA-3 radio receiving equipments; frequency range: 15 to 600 kc (and Supplement No. 1, dated 12 Dec 45). Oct 1942. 105 p. Price: Microfilm-$1.50 - Photostat-$7.00
These equipments, which are identical except for nameplates, have been designed for use aboard Naval vessels and at Navy radio shore stations. They are designed for the reception of pure, modulated, or interrupted continuous wave (CW) radio frequency signals in the frequency range 15 to 600 kc. Voice reception is possible but intelligibility of speech is poor. Special features include: (a) Provision for operation of a number of receivers from a common antenna or transmission line; (b) provision for the simultaneous operation of two receivers from a common power unit; and (c) automatic regulation of the receiver output signal voltage as a function of load resistance. The receiver employs an antenna circuit, followed by three stages of radio frequency amplification, a detector, a heterodyne oscillator, two voltage-amplifying audio frequency stages and a power output stage. Parts lists, tube data, photographs, and diagrams are included. A supplement gives instructions for the rectifier power unit type CRV-20130, manufactured by RCA Victor.

PB 17470. FEDERAL TELEPHONE AND RADIO CORPORATION, NEWARK, N. J. Instruction book for Navy model TBW radio transmitting equipment. Nov 1942. 100 p. Price: Microfilm-$1.00 - Photostat-$7.00
This is an adaptable combination of units which function collectively as a multi-channel radio telegraph transmitter capable of three kilowatts carrier output in the frequency range from 2 to 20 megacycles, emission A-1. The equipment is especially suited to airline ground stations and general communications use. The following subject matter is covered in the text: general and detailed description, installation, adjustment, operation, and maintenance. Tables, outline drawings, schematic diagrams, wiring diagrams, charts, curves and photographs are attached.

PB 17404. GENERAL ELECTRIC COMPANY. Diversity radio receiving equipment, Model RAF. (Instructions GEI-6737A) Jun 1933. 79 p. Price: Microfilm-$1.00 - Photostat-$6.00
The model RAF equipment is designed primarily for use at shore radio stations to receive telegraph signals from near and distant transmitters and, in case of fading, to nullify that phenomenon. The equipment will also handle MCW. It is capable of adjustment to any frequency within the range 3750 to 25,000 kc. Three receivers, which are identical mechanically and electrically, are used in the equipment, operating from antennas about 1000 feet apart. The receivers are of the tuned RF type. The signals from the three receivers are "mixed" to nullify fading. The handbook contains construction, information, installation, operation, and maintenance instructions, performance data, parts lists, drawing, diagrams, and photographs. Manufactured for the Navy Department, Bureau of Engineering.

PB 17804. GENERAL ELECTRIC COMPANY. Instructions: Model TAR 200-watt radio telegraph transmitting equipment. (GEI 5604) May 1931. 145 p. Price: Microfilm-$1.50 - Photostat-$10.00
The model TAR transmitter, and associated equipment, is designed primarily for service on submarines where a compact, low power, intermediate and high frequency transmitter is required. CW and MCW transmission in any frequency of the following five bands is provided: 300 to 600 kc; 4000 to 4525 kc; 8000 to 9000 kc; 12,000 to 13,575 kc; and 16,000 to 18,100 kc. The 200 watt transmitter is designed to operate with special submarine antennas designated as the vertical antenna, the flat top antenna, the forward loop and the after loop. Photographs, diagrams, and tube characteristic information are appended. The equipment was manufactured under contract for the Navy Department, Bureau of Engineering.

PB 17802. GENERAL ELECTRIC COMPANY. Instructions: Model TAT 500-watt radio telegraph transmitting equipment. (GEI-5349) Jan 1931. 57 p. Price: Microfilm-$1.00 - Photostat-$4.00
This transmitter, manufactured for the Navy Department, Bureau of Engineering, is designed primarily for use on battleships and other fleet units for communication with aircraft, and for use at certain shore stations. The frequency range is from 500 to 1500 kc. This transmitter will deliver a minimum of 500 watts of pure radio frequency power at any frequency within the specified band. It may be keyed using either CW or MCW, at speed up to 100 words per minute. The text is composed of the following data: component units, installation, wiring, antenna characteristics, power supply, electron tubes, frequency range, rating, method of signalling, theory of operation, safety precautions, adjustment and maintenance of transmitter, typical MO and PA tuning, typical performance data, analysis of losses, and installation and operation of crystal frequency indicator. Photographs, graphs, outlines, and schematic diagram are attached.

PB 17498. GENERAL ELECTRIC COMPANY. Instructions: 1-KW high frequency radio telegraph transmitting equipment Model TBA. (GEI 6484A) Dec 1932. 168 p. Price: Microfilm-$2.00 - Photostat-$12.00

The model TBA transmitter and associated equipment is designed primarily for service on vessels in the U. S. Navy where a compact, high frequency transmitter is required. The component units are a transmitter unit, a motor generator set, a magnetic controller, and a filter unit. Frequency range is 4000 to 26,000 kc with CW transmission at 600 to 1000 watts. Parts lists, tuning charts, photographs, instruction bulletins, diagrams, and tube characteristics are included. This equipment was manufactured for the Bureau of Engineering, Navy Department.

PB 17813. GENERAL ELECTRIC COMPANY. Instructions: 2 KW radio telegraph transmitting equipment, model TAQ-4. (GEI-7700A) Apr 1936. 122 p. Price: Microfilm-$1.50 Photostat-$9.00
This transmitter and associated equipment, manufactured for the Navy Department, Bureau of Engineering, is designed for service where a compact, medium power, intermediate frequency transmitter is required. Frequency range is 175 to 600 kc. Selection of either the CW or MCW method of transmission is effected by means of a control on the front panel. Power output is from 650 to 2080 watts depending on frequency and antenna systems. The equipment operates on 440-volt, 3-phase, 60-cycle power supply. Commercial bulletins are attached. Diagrams and schematic diagrams are included separately.

PB 17710. GENERAL ELECTRIC CO. Portable radio equipment, Navy models TBO and TBO-1. Auxiliary power equipment, Models EF, EG, EH and Dynamotor, Type CG-21265. (Manufactured by General Electric Co.) (GEI-8541B) Jul 1939. 110 p. Price: Microfilm-$1.50 - Photostat-$8.00
Portable radio equipment designed for communication between similar equipment installed ashore, aboard ship, etc. at ranges of 30 miles for CW and 15 miles for phone transmission. Transmitter has a frequency range of 2000 to 3500 KC-CW and phone self excited transmission is possible at any frequency in this range. CW and phone crystal controlled transmission is possible at any two frequencies in the band for which crystals are provided. The receiver has a frequency range of 2000-8000 KC. Power output; CW 9 watts; phone 3 watts. Construction of the basic models, their component parts and field equipment, is followed by instructions for installation, operation and adjustment, maintenance and servicing of the basic units, component parts and auxiliary power equipment. Photographs, curves, tables, diagrams, and parts lists are included.

PB 17837. GENERAL ELECTRIC COMPANY. Preliminary instructions book for Navy model TBA-11 radio telegraph transmitting equipment, and addendum 2, dated Mar 44. (GEI-19245) Jan 1944. 8 p. Price: Microfilm-50¢ - Photostat-$1.00
This instruction book covers installation, operation, adjustments, and maintenance of model TBA-11 radio telegraph transmitting equipment, designed primarily for service as a high frequency transmitter for shore stations, which can, by certain changes, also be used for shipboard installations. The radio transmitter is capable of continuously variable adjustment to, and operates at, any frequency in the specified frequency range 4000 to 26,000 kilocycle when working into antenna systems whose characteristics are as described under antenna characteristics. The nominal power output is 1 kilowatt and the type of emission is CW (A1). The equipment is designed for operation from 220 volts, 3-phase, 60 cycles. The book contains tuning curves, wiring diagrams, outline drawings, photographs, and a booklet on how to grease ball-bearing motors by means of GE pressure-relief system.

PB 17748. GENERAL ELECTRIC COMPANY. Preliminary instruction book for Navy model TBO-5 radio telegraph transmitting equipment; Vol I - Installation and operation. (GEI-19520) Feb 1944. 376 p. Price: Microfilm-$4.00 - Photostat-$26.00
TBO-5 radio telegraph transmitter is designed as the main high frequency transmitter to be used at shore stations for shore to ship service. It has a frequency range of 4000 to 26,000 kc., nominal power output of 50/40 kw., and emission is CW(A-1). Following construction and theory of operation are instructions for the installation, adjustment, maintenance and servicing of the equipment and its components. Antenna characteristics, vacuum tubes used, power supply, and water cooling system are discussed. Drawings, curves, tables, connections and schematic diagrams, and photographs are included.

PB 17807. GENERAL ELECTRIC COMPANY. Preliminary instruction book for Navy models TCX & RBD radio telegraph and telephone transmitting and receiving equipments. (GEI-16646) Sep 1943. 142 p. Price: Microfilm-$1.50 - Photostat-$10.00
These equipments, manufactured for the Navy Department, Bureau of Ships, are designed to fulfill the requirements of providing satisfactory communication between similar equipments installed ashore, aboard ship, or in small boats; also between such equipments and other units of the Naval communication system. The equipment is particularly designed for application to small boats where weight and power consumption are of major importance. The transmitter, Navy type CG-82228 (1.5 to 12 mc; 36 watts, CW); 9 watts, phone), and the receiver, Navy type CG-46132 (1.5 to 12 mc; CW, MCW, and phone) are the major components. In addition to description and operating and maintenance instructions, the book contains parts lists, curves, drawings, and diagrams.

PB 16890. GORDON, R. A. and MACGREGOR, J. J. Report on tests of model CXAR aircraft radio transmitting equipment (manufactured by the Bendix Radio Corp., Baltimore, Md.). (Naval Research Lab Rept R-1739) May 1941. 69 p. Price: Microfilm-$1.00 - Photostat-$5.00
This equipment includes 4 master oscillator transmitter units and an intercommunication system unit. Two transmitters each cover the range 540 to 1500 kc and the two others each cover the range 3000 to 9050 kc. CW, MCW and voice emission is provided. Mechanical, electrical, and flight tests were conducted to determine whether the equipment met its specifications. It was concluded that equipment was not satisfactory for use in the naval service as tested and recommendations for change are given. Tables and graphs showing performance under test are included as are photographs and a block diagram of the equipment.

PB 17584. GORDON, R. A. and SHUPE, P. D. Tests of model CXAP aircraft transmitting equipment, manufactured by the Westinghouse Electric and Manufacturing Company of Baltimore, Maryland. (Naval Research Lab Rept R-1864) Apr 1942. 129 p. Price: Microfilm-$1.50 - Photostat-$9.00
The model CXAP transmitting equipment is intended for installation in Naval observation, scouting and bombing aircraft. Communication with other units of the Naval Service can be effected in the 540 to 1500 or 3000 to 9050 kilocycle frequency bands. The transmitter equipment consists of three major units interconnected by cables so as to operate as a single assembly unit, the three units containing the necessary circuits, tubes and control apparatus for taking power from a 28-volt d-c supply and delivering telegraphically keyed CW, MCW and voice radio frequency energy to existing Naval aircraft antennas. The three units consist of a three channel transmitter, a pilot's control box and a dynamotor unit, all interconnected by suitable cables. After testing, it was concluded that the model CXAP transmitting equipment will be suitable for Naval Service as a three channel electrical selection transmitter providing certain modifications are made to the mechanical construction and a few of the electrical features. These modifications do not require a major redesign of the equipment in order to obtain dependable operation, but do require a partial constructional redesign to permit servicing without disassembling the transmitter unit. Data recorded during the tests in the form of tables, graphs and photographs are appended to this report. A discussion of this information is also included.

PB 18078. HALLICRAFTERS COMPANY, CHICAGO, ILLINOIS. Instruction book for model RCR-1, portable radio receiving equipment. Nov 1944. 32 p. Price: Microfilm-50¢ - Photostat-$3.00

The Model RCB-1 portable radio receiving equipment consists of a Type CHL-46240 radio receiver. It is referred to in the text of this report as the Model S-39 "Sky Ranger" receiver. This 9-tube superheterodyne communications receiver is suitable for table or portable use. Tuning range provides coverage in four bands of the frequencies between .55 and 30 mc. It accepts either CW or amplitude modulated telephone signals. The set is completely self contained with telescoping antenna, speaker and batteries. In addition, it may be operated from commercial power sources. Volume outlines circuit functions, installation, operation, alignment and service, and supplementary data. Tables of tube socket voltages and replaceable parts, schematic diagram, and photographs are included.

PB 17786. HALLICRAFTERS CO., CHICAGO, ILL. Instruction book for model S-27D RBK radio receiving equipment. n.d. 35 p. Price: Microfilm-50¢ - Photostat-$3.00
This equipment consists of a type CHL-46130 receiver mounted in a table mounting cabinet. The circuit is that of a conventional super-heterodyne receiver preceded by one stage of tuned radio frequency amplification. The intermediate frequency amplifier of the super-heterodyne circuit terminates in both amplitude modulation and frequency modulation detector circuits which can be switched to the same audio amplifying system by means of the front panel AM-FM switch, thus providing either type of reception. This receiver tunes through a frequency range of 27.8 to 143 megacycles in 3 bands. This book contains sections on the following subjects: Description of equipment, installation, adjustment and operation, alignment and service, electrical and mechanical data, lists of manufacturers, replaceable parts and spare parts. Diagrams and photographs are included.

PB 19794. HOLABIRD SIGNAL DEPOT, BALTIMORE, MD. Minimum required field intensities for intelligible reception of radiotelephony in presence of atmospherics or receiving set noise. (Radio Propagation Unit Tech Rept 5). Dec 1945. 64 p. Price: Microfilm-$1.00 - Photostat-$5.00
This report shows in graphical form the minimum required incident received field intensity for intelligible reception of radiotelephony in the presence of atmospheric or receiving set noise. The curves showing required field in the presence of atmospheric noise are based upon noise measurements made throughout the world at different hours of the day and seasons of the year, and a knowledge of the locations of the important world atmospheric noise centers. The assumption that the receiving antenna responds equally to the desired signal and the atmospheric noise has been made in plotting the curves. When this is not the case the required field will be somewhat different. Curves showing the required incident field intensities when set noise is the limiting factor have also been prepared. These curves are plotted for various vertical angles of reception with various antennas.

PB 19798. HOLABIRD SIGNAL DEPOT, BALTIMORE, MD. Relative sky-wave signal strengths required for intelligible reception of various types of radio communication service. (Radio Propagation Unit Tech Rept 4). Aug 1945. 7 p. Price: Microfilm-50¢ - Photostat-$1.00
This report has been prepared as a preliminary guide for use in determining the relative sky-wave signal strengths necessary for intelligible reception of various types of radio communication service as limited by atmospheric or receiving set noise. The types of radio service included are those encountered in present military communication systems. Where possible the data is based on field experience. In other cases the systems have been analyzed with respect to the band width requirements and advantages peculiar to the systems in reducing the disturbing effect of the noise. A chart gives the signal strengths required for various service in decibels referred to that required for double sideband radiotelephone service.

PB 16900. LIEBSON, S. H. and DAVIS, C. E. Tests of Communications, Inc., 50-watt radio telephone equipment. (Naval Research Lab Rept R-1724. BuShips Prob. T5-39C) Apr 1941. 114 p. Price: Microfilm-$1.50 - Photostat-$8.00
The material tested includes a model 50A transmitter unit, model 66B receiver unit and model 56B modulator and power unit. Tests were performed to determine the suitability of this equipment for naval use and to ascertain what changes might insure satisfactory Naval operation. The receiver has a frequency range of 1650 to 3360 kc while the upper limit of the transmitter is approximately 5000 kc. Both units are crystal controlled and pre-set frequencies can be selected by a switch. The receiver is continuously variable within its range. Tests included a thorough mechanical and electrical examination of the equipments. The material tested was found to be generally satisfactory but numerous recommendations for improvement are made. This report contains performance tables and curves, photographs and schematics.

PB 17980. MAGNAVOX COMPANY, FORT WAYNE, INDIANA. Instruction book for Navy model RAK-8 radio receiving equipment, Class IA, A-C operated. Jan 1943. 89 p. Price: Microfilm-$1.00 - Photostat-$4.00
These instructions cover the installation, operation, and servicing of this receiving equipment. It is designed for a-c operation, being equipped with a power unit for supplying all operating voltages required from an a-c source of 110, 115, or 120 volts, 60 cycles, single phase. It covers the frequency range of 15-600 kc. and is designed for optimum performance for the reception of pure, modulated or interrupted CW or damped radio telegraph signals. Voice modulated reception is not recommended. It may be used independently or adjacent to an RAL series equipment, forming a complete two-channel equipment suitable for guarding two frequencies simultaneously by one operator. Parts lists, illustrations, schematic and connection diagrams are included. This equipment was manufactured for the Bureau of Ships, Navy Department.

PB 17455. MEMOVOX, INC., BEVERLY HILLS, CALIFORNIA. Model PE voice recording equipment. Apr 1942. 81 p. Price: Microfilm-$1.00 - Photostat-$6.00
These instructions cover the installation, operation, maintenance, and all pertinent data in connection with model PE voice recording equipment. The equipment consists of a cabinet, power control unit, signal input panel, and two transcriber-reproducer units. The constant linear speed system, in which the surface speed at any point on the radius is a fixed number of inches per second is used. Clock control is provided for continuous automatic operation. The equipment was manufactured for the Navy Department, Bureau of Ships. Photographs, drawings, diagrams, and schematic diagram are attached to the instructions.

PB 17474. NATIONAL COMPANY, INC., MALDEN, MASSACHUSETTS. Instruction book for radio receiving equipment, model RAN. Jun 1939. 83 p. Price: Microfilm-$1.00 - Photostat-$6.00
This equipment is a complete radio receiving equipment suitable for use at Naval radio shore stations or aboard Naval vessels for reception of radio telephone or telegraph signals (either CW or MCW) by either headphone or loudspeaker methods. The receiver is a nine tube, rack mounted superheterodyne covering a frequency range of from 175 to 400 kc and from 480 to 30,000 kc. The type CRA-20090 power unit is designed for operation from a power source of 110/120 volts A. C. 50/60 cycles. Construction, operation, maintenance and test, performance and alignment data are covered in Parts lists, photographs, curves, outline drawings and wiring diagrams are included. This equipment was manufactured for the Bureau of Engineering, Navy Department.

PB 16099. NATIONAL ELECTRICAL SUPPLY COMPANY, WASHINGTON, D. C. General operating instructions for Model TAV-1, U. S. Navy portable radio equipment. 1930. 42 p. Price: Microfilm- 50¢ - Photostat-$3.00
This portable radio telephone equipment consists of a radio transmitter (Type-CE-3311) and a radio receiver (Type-CE-3313) with accessories. The transmitter unit is made up of a master oscillator power amplifier combination. The receiv-

er consists of one stage of radio frequency amplification, a regenerative detector and two stages of audio frequency amplification. The frequency range of the set is 300-600 kilocycles and 2000-4525 kilocycles. Power is supplied by a 1-3/4 H.P. Briggs and Stratton FJ-1, running at 3400 R.P.M. The generator supplies 8 volts at 6½ amperes and 500 volts at .220 amperes at 3400 R.P.M. Included are detailed descriptions of the various parts, instructions for installation, operation and maintenance, photographs, circuit diagrams, drawings, and diagrams.

PB 17906. PANORAMIC RADIO CORPORATION, NEW YORK CITY. Preliminary Instruction Book for Navy Model REW-1 panoramic radio adaptor. Jun 1943. 62 p. Price: Microfilm-$1.00 - Photostat-$5.00
The panoramic radio adaptor is a device which, when connected to a radio receiver, allows the operator to visualize the radio spectrum on a two dimensional surface. On the horizontal axis of the screen (base line) frequencies are shown, while the signal amplitudes are shown on the vertical axis. This model enables the operator to see on the screen, all stations receivable within a 100 kilocycle band of the station to which he is listening. This band extends 50 kilocycles above and below the frequency to which the receiver is tuned. The model has an input frequency of 400 kilocycles, and is wired for 115/230 volt, 50/70 cycles, A. C. operation. Included are descriptions of the equipment, instructions for installation, operation, and maintenance. Drawings and schematic diagrams.

PB 17905. PANORAMIC RADIO CORPORATION, NEW YORK CITY. Preliminary instruction book for Navy model REW-2 panoramic radio adaptor. Jun 1943. 63 p. Price: Microfilm-$1.00 - Photostat-$5.00
This model is designed to operate with a receiver having an i-f frequency of 5.25 mc and has a sweepwidth of 1 megacycle. It is wired for operation from a 115/230 volt, 50/70 cycles single phase, alternating current, power source. Upon connecting the adaptor to an ordinary radio receiver, the operator will be enabled to see on a screen, all stations receivable within a 1000 kilocycle band of the station to which he is listening. This band extends 500 kilocycles above and below the frequency to which the receiver is tuned. Included are descriptions of the equipment; instructions for installation, operation and maintenance; lists of parts; color code charts; an illustration of the radio frequency spectrum; photographs and diagrams. Errata and addenda sheets are appended.

PB 18096. PANORAMIC RADIO CORP, NEW YORK, N. Y. Preliminary instruction book for Navy model RIK panoramic radio adaptor (manufactured by Panoramic Radio Corp., New York, N. Y.) Jun 1943. 62 p. Price: Microfilm-$1.00 - Photostat-$5.00
Upon connecting subject adaptor to an ordinary radio receiver, the operator will be enabled to see, on a screen, all stations receivable within a 3 megacycle band of the station to which he is listening. This band extends 1500 kilocycles above and below the frequency to which the receiver is tuned. The receiver will operate normally and the operator will not only hear the station to which it is tuned, but will also see it and signals of adjacent frequency. This will allow him to intercept quickly any stations appearing on the air, even for short periods of time. The book includes sections covering general description, installation and operation, maintenance, and tables listing items and parts, spares, and color code charts. Photographs, drawings and circuit diagram are also included.

PB 17706. PRESS WIRELESS, INC., HICKSVILLE, N. Y. Instruction book for Navy Model TEB radio telegraph transmitting equipment. n.d. 152 p. Price: Microfilm-$2.00 - Photostat-$11.00
General description and technical characteristics of transmitter designed for radiotelegraph operation over a frequency range of 4,000 to 21,000 kc., with a power output of 15 kw. over the entire frequency range. Output circuits are designed to work into a balanced 2-wire transmission line of 550 to 650 ohms impedance with zero reactance. The circuit is designed for CW emission, with provision for teletype operation. This transmitter is used for shore to ship or point to point communication, and may be divided into 9 different circuits, the functioning of which are given detail. Following this are sections on installation preparation for operation and maintenance of the equipment and its component parts. Photographs, tables, curves, schematic diagrams and parts lists are included.

PB 17403. RADIO CORPORATION OF AMERICA MANUFACTURING COMPANY, INC. Instructions for model RAL-2 radio receiving equipment: Class IIA - A.C. operated; range: 0.3-23 megacycles. (Instruction Book 23900-1) Nov 1936. 57 p. Price: Microfilm-$1.00 - Photostat-$4.00
These instructions cover the installation, operation, and servicing of the model RAL-2 radio receiving equipment. A power unit is furnished supplying all operating voltages required from an a-c source of 115 volts, 60 cycles. The equipment covers the frequency range of 0.3-23.0 mc and is designed for optimum performance for the reception of pure, modulated or interrupted CW, damped radio telegraph signals, or voice modulated CW. It may be installed adjacent to a model RAK-2 equipment forming a complete two-channel equipment suitable for guarding two frequencies simultaneously by one operator. Parts lists, photographs, and diagrams are included. The equipment was manufactured for the Navy Department, Bureau of Engineering.

PB 17402. RADIO CORPORATION OF AMERICA MANUFACTURING COMPANY, INC. Model RAL-3 radio receiving equipment, class IIA-A.C. operated; range: 0.3-23 megacycles. Instructions. (Instruction Book 23900-2) Jun 1937. 57 p. Price: Microfilm-$1.00 - Photostat-$4.00
These instructions cover the installation, operation, and servicing of the model RAL-3 equipment, which covers the frequency range of 0.3 to 23.0 mc and is designed for optimum performance for the reception of pure, modulated or interrupted CW, damped radio telegraph signals, or voice modulated CW. The RAL-3 equipment is designed for independent operation, but may be installed adjacent to a model RAK-3 equipment forming a complete two-channel equipment suitable for guarding two frequencies simultaneously by one operator. A separate control unit, Type CBV-23073, may be used for this installation to provide greatest flexibility of operation. Photographs, curves, and diagrams are included. The equipment was manufactured for the Navy Department, Bureau of Engineering.

PB 17960. RADIO CORPORATION OF AMERICA VICTOR COMPANY, INC. Instructions for Model TAJ-4 radio-telegraph transmitting equipment. (INSTRUCTION BOOK 23271) May 1933. 61 p. Price: Microfilm-$1.00 - Photostat-$5.00
The model TAJ-4 radio telegraph transmitter and associated rectifier, and power supply equipment are primarily designed for CW and MCW radio telegraph service in the frequency range of 175 to 600 kilocycles on all types of Naval vessels except submarine, wherever a compact, low power, intermediate-frequency transmitter of modern design is required. This equipment is designed for operation on a 230-volt, 3-phase (3-wire) 60-cycle A.C. supply, and requires 2.82 KW for full power key locked operation; while the transmitter output is governed by the characteristics of the antenna, the nominal output is 500 watts. The book contains sections covering general description, theory of operation, component units, vacuum tubes, remote control and keying, installation, adjustment after installation, operation of transmitter, maintenance and lubrication, parts list and spare parts. Price sheets and descriptive material from the Square D Company covering parts for time limit overload relay, overload protective devices and A.C. magnetic contactors are included. Photographs, drawings, schematic, and connection diagrams are included.

PB 17702. RADIO CORPORATION OF AMERICA VICTOR CO., CAMDEN, N. J. Instructions for Model TBG radio-telegraph transmitting equipment. (Instruction Book 23260) Mar 1933. 80 p. Price: Microfilm-$1.00 - Photostat-$6.00

This equipment, manufactured for the Navy Department, Bureau of Engineering is designed for service on submarine or surface vessels, and covers both intermediate and high frequency ranges. It has a CW frequency range from 2000 to 18,100 kc and a CW or MCW frequency range from 300 to 600 kc. The transmitter has a rated output of 200 watts. Construction of the transmitter and component parts and instructions for their installation, operation adjustments, and maintenance are given. A table of antenna characteristics, a supplement on crystal box installation, parts lists, photographs, curves, drawings, schematic diagrams are included.

PB 17457. RADIO CORPORATION OF AMERICA. VICTOR COMPANY. Model PC facsimile terminal equipment, type GE-23. Instructions. (Instruction Book 23267) Apr 1933. 49 p. Price: Microfilm-50¢ - Photostat-$4.00
These instructions give a brief description of facsimile terminal equipment, model PC, and gives information for its installation, operation, and service. By means of this equipment facsimiles of written, drawn, or printed matter can be transmitted by radio to distant points. Each terminal equipment provides for either transmission or reception, but not simultaneously. Its component parts are a frequency standard, inverter, scanner with scanner amplifier, limiter, monitor receiver, and recorder. The scanning process has greatly simplified electrical circuits. The recording is of the carbon paper type, requiring no photographic developing process. Drawing, and wiring diagrams are included. The equipment was manufactured for the Navy Department, Bureau of Engineering.

PB 17854. RADIO CORPORATION OF AMERICA VICTOR COMPANY, INC. Model RAB-1 radio receiving equipment, Class II, A-C operated, instructions. (Instruction book 23207-1) Feb 1934. 41 p. Price: Microfilm-50¢ - Photostat-$3.00
The equipment is of the A.C. operated superheterodyne type and covers the frequency range of 1000-30,000 kcs. Best performance is realized for the reception of pure, modulated or interrupted CW or damped waves, or telephone modulated radio frequency signals. Operation is from a 110 volt, 60 cycle power supply. The component parts are on RF tuner, intermediate and audio frequency amplifier and a power unit. The handbook describes the equipment and circuit arrangements and gives instructions for its installation, operation and maintenance. A parts list, photographs, drawings, wiring and schematic diagrams are included. This equipment was manufactured for the Bureau of Engineering, Navy Department.

PB 17401. RADIO CORPORATION OF AMERICA VICTOR COMPANY, INC. Model RAB-1 diversity receiving equipment; Instructions. (Instruction Book 23244-1) Feb 1934. 81 p. Price: Microfilm-$1.00 - Photostat-$6.00
These instructions cover the installation, operation and servicing of the model RAB-1 diversity receiving equipments, designed primarily for use at shore stations of the U. S. Navy, and manufactured for the Bureau of Engineering, Navy Dept. The receiving equipment proper is essentially identical with the model RAB-1 receiving equipment. The instruction book for that equipment (IB-23207-1) therefore forms part of this report. The diversity receiver system has been developed in order to minimize the effects of static and other interference, and fading, and to give reliable high-speed communication on trans-oceanic or similar long-distance circuits. The equipment furnished is of the three-channel, keyed-tone type. Where simultaneous reception of a number of stations is required, the audio frequency signals delivered by several diversity equipments may be sent to a central telephone office over a single tone line. The receivers cover the frequency band of 1 to 30 mc. Three spaced antennas are used, connected to the receivers by balanced transmission lines. Equipment operates up to the very high keying speed of 1,000 words per minute. Drawings, diagrams and photographs are attached, together with an instruction manual for the RAB-1 receiving equipment.

PB 17810. RADIO MARINE CORPORATION OF AMERICA, NEW YORK, N. Y. Installation and operating instructions for U. S. Navy Model RAZ radio receiver. Dec 1939. 11 p. Price: Microfilm-50¢ - Photostat-$1.00
Model RAZ is a compact intermediate and low frequency receiver, using metal tubes, and designed primarily for marine applications. It covers a continuous frequency range of 15 to 600 kc., divided into 4 bands. Instructions for installing and operating the unit and its component parts are given. Parts lists, photographs, tables, and drawings are included.

PB 17467. RADIO MARINE CORPORATION OF AMERICA, NEW YORK, N. Y. Instruction book, model TBF radiotelephone transmitting equipment. Aug 1943. 98 p. Price: Microfilm-$1.00 - Photostat-$7.00
The model TBF radio-telephone transmitting equipment is designed primarily for installation in Naval shore stations for communication with ships or other shore stations. Nominal power output: 125 watts CW, 125 watts MCW, 125 watts phone. Frequency range: 2000 to 9400 Kcs. The following subject material is covered in the text: general description, vacuum tubes, power supply, antenna characteristics, radio frequency circuits, audio frequency circuits, keying circuits, power supply and relay circuits, installation and conversion of frequencies etc., instructions for adjustment, operation and maintenance, voltage measurement, vacuum tube data, location of trouble. Tables, photographs, graphs (calibration charts), drawings, and schematic diagram are attached.

PB 17609. RADIO MARINE CORPORATION OF AMERICA, NEW YORK, N.Y. Instruction book: Radio receiving equipment Model RAZ-1; Revised edition. Jul 1942. 18 p. Price: Microfilm-50¢ - Photostat-$2.00
The equipment manufactured for the Bureau of Ships, Navy Department, is comprised of a radio receiver, a pre-selector and a rectifier power unit. It operates over a frequency range of 15-600 kcs, divided into four bands and utilizes a 110 volt, 50/60 cycle power line for a power drain of approximately 40 watts. It may be operated from storage batteries if no A.C. current is available. The pre-selector unit reduces radiation originating in the receiver and also provides added gain and selectivity for the receiver. The manual gives information on the installation, operation and adjustment of the equipment. It also includes photographs, drawings and schematic diagrams.

PB 18097. RCA VICTOR DIVISION, CAMDEN, N. J. Navy model RBM diversity radio receiving equipment; Instructions. (IB-25983-1) n.d. 47 p. Price: Microfilm-50¢ - Photostat-$4.00
Subject radio receiver is designed for reception of either continuous wave or modulated carrier signals with frequencies between 535 and 32,000 kilocycles. This book contains sections giving technical summary, component parts of equipment, and instructions for installation, operation and maintenance. Table of replaceable parts, photographs, drawings, and diagrams are included.

U.S. Navy Yard

PB 18059. SLAVIN, S. Instructions for installation and operation of code practice equipment model CW-1 and 2. (RW10A527). Nov 1942. 25 p. Price: Microfilm-50¢ - Photostat-$2.00
This equipment was manufactured for the Bureau of Ships, Navy Department by the Navy Yard at Washington, D. C. It consists of a vertical mounting rack containing essentially an oscillator-amplifier unit and a distribution unit. The equipment can accomodate 39 students and an instructor for telegraph or radiotelegraph code instruction. Sending, receiving and net operation of up to 20 nets may be practiced. These instructions cover the installation and operation of the equipment with a brief section on its maintenance. Photographs, schematic drawings, and a spare parts list are included.

PB 17462. SOUNDSCRIBER CORPORATION, NEW HAVEN, CONN. Instructions for model PJ sound recording equipment. Oct 1942. 56 p. Price: Microfilm-$1.00 - Photostat-$4.00
The model is a complete voice recording equipment for transcribing voice, or other audio signals, on discs, and reproducing the signals from the discs. The signals may be monitored with head phones while actually recording on the disc. The discs may be reproduced through head phones or a loud speaker. The equipment operates from 115 volts, 60 cycle, single phase, a-c at 33 r.p.m. Construction, installation, operation, maintenance, test data, are covered in the instructions and are illustrated by outlines, charts, photographs, tables, and schematic diagram. The equipment was manufactured for the Navy Department, Bureau of Ships.

PB 18000. U. S. NAVY DEPARTMENT. Instruction book, Navy model TCP-3, transmitting-receiving radiotelephone equipment. (Manufactured by Radiomarine Corporation of America, 75 Varick St. N. Y.). Apr 1944. 90 p.
Price: Microfilm-$1.00 - Photostat-$7.00
This equipment consists of a compact medium power crystal-controlled radiotelephone transmitter and receiver designed for installation aboard vessels of the United States Navy. The frequency range is from 2,000 to 3,000 kcs; type of emission, telephone (A-3); and nominal power output is 75 watts. Included are descriptions of the component parts; instructions for operation, installation, adjustments, and maintenance; winding data; lists of vacuum tubes, parts, spare parts; a table showing call letters of coastal harbor stations and crystal list. Photographs, schematic wiring diagrams and drawings are included.

PB 13611. U. S. NAVY DEPARTMENT. BUREAU OF AERONAUTICS. Installation specification for model AN/ARW-2 or AN/ARW-2X air-borne radio equipment. (NAVAER-EI-115). Aug 1944. 8 p. Price: Microfilm-50¢ - Photostat-$1.00
The purpose of this specification is to give, in details, Buaer requirements and other information necessary for completing a satisfactory installation of the AN/ARW-2 or 2X radio equipment in aircraft for which this equipment is specified. Drawings are included.

PB 18062. U. S. NAVY DEPARTMENT. BUREAU OF ENGINEERING. Instruction book for Model TCC radio telegraph and telephone transmitting equipment. (Manufactured by Collins Radio Co., Cedar Rapids, Iowa). Apr 1939. 142 p. Price: Microfilm-$1.50 - Photostat-$10.00
This equipment is composed of two cabinets or bays (a power bay and an autotune r-f bay) a station control unit, a remote operator's control unit, and a remote operator's desk set. The transmitter operates on any of 10 crystal-controlled channels in the range from 2,000 to 30,000 kc with an output of 1000 watts. Emission may be CW, MCW, or voice. This manual provides information on circuit function, installation, adjustment, and maintenance of this equipment. It includes parts lists, tables of tube characteristics, labeled photographs, installation drawings, diagrams and schematics.

PB 18022. U. S. NAVY DEPARTMENT. BUREAU OF ENGINEERING. Instruction book, model TAL 25 KW. crystal control transmitter class 11-S. (Manufactured by Westinghouse Electric and Manufacturing Co., Chicopee Falls, Mass.). (IB. 5541A). Jun 1928. 78 p. Price: Microfilm-$1.00 - Photostat-$6.00
This model was intended for use as a main communication unit at a land station, with the nominal power rating of 25 kw. and a frequency range of 8000 to 21,500 kilocycles. The transmitter is so equipped and designed as to enable a shift to be made from one of two previously calibrated frequencies to another in one-man minute, entirely from front panels of the units. There is an addendum, with diagrams, covering modifications for use of mercury vapor rectifier tubes and adding a third quick shift. Included are detailed descriptions of the various parts, and their operation; instructions for installation, operation and maintenance, photographs, schematic and wiring diagrams; and lists of parts.

PB 18023. U. S. NAVY DEPARTMENT. BUREAU OF ENGINEERING. Instructions, portable transmitter and associated equipment model TAN, 50 watts output. (Manufactured by General Electric Company). (GEI-3648). Jun 1929. 40 p.
Price: Microfilm-50¢ - Photostat-$3.00
This equipment was designed for beach use or boat use under conditions which demand extreme ease of portability, light weight, and ruggedness. It provides CW operation on any frequency between 2000 and 3000 kilocycles with an output of 50 watts. Power supply is obtained from a double current generator which is driven by a two cycle gas engine. The generator supplies 12 volts l.c. for the filament circuit and 1000 volts d.c. for the plate circuit of the power amplifier tube. Descriptions of the equipment; instructions for installation and operation; photographs; schematic, connection and wiring diagrams; and drawings are included.

PB 17445. U. S. NAVY DEPARTMENT. BUREAU OF ENGINEERING. Model RAA-4 radio receiving equipment, Class I, A-C operated, range 10-1,000 kc. Instructions. (Manufactured by RCA Mfg. Co., Camden, N. J.) (Instruction Book 28654) Dec 1937. 66 p. Price: Microfilm-$1.00 - Photostat-$5.00
This instruction book covers the installation, operation and servicing of the model RAA-4 radio receiving equipment. This equipment is designed to provide optimum performance in the reception of pure, modulated or interrupted, continuous or damped waves, and telephone-modulated radio-frequency signals over the frequency range of 10 to 1,000 kilocycles. It is of the superheterodyne type and operates directly from a 110-, 115-, or 120-volt, 60-cycle power supply. The output circuit of each equipment is designed for use with from one to four pairs of 600-ohm telephone receivers connected in parallel. The equipment is comprised of three major units, a radio-frequency tuner, an intermediate and audio-frequency amplifier, and a power unit. The book contains photographs, graphs, drawings, wiring diagrams, and a parts list.

PB 18058. U. S. NAVY DEPARTMENT. BUREAU OF ENGINEERING. Model TAB radio telegraph transmitter. Instruction book. (Manufactured by Westinghouse Electric & Manufacturing Company, Chicopee Fall, Mass.). (I.B. 5425). n.d. 34 p. Price: Microfilm-50¢ - Photostat-$3.00
The 2 kilowatt transmitter described in this instruction book was designed for land station service. It can be tuned to any frequency from 100 to 550 kc in from three to five minutes, and can be shifted from any one predetermined frequency to another in less than 10 seconds. The frequency range is split into two bands, one from 100 to 350 kc and the other from 250 to 550 kc. The power output can be varied within reasonable limits by varying the plate potential. The design allows the antenna to be thrown out of tune without danger of damaging the tubes. The radio transmitter, consisting of a master oscillator, an audio oscillator, an intermediate amplifier and a power or output amplifier, is mounted in two angle iron frames. The power equipment consists of two motor-generators, an automatic motor starter, a remote control panel, and a transfer switch. Photographs of the transmitter and its parts taken from various angles, with schematic and wiring diagrams, outline drawings, and charts are used to illustrate the text.

PB 18055. U. S. NAVY DEPARTMENT. BUREAU OF ENGINEERING. Model TAF-1 radio telegraph transmitting equipment, 1-KW. output. (Manufactured by General Electric Company). Aug 1929. 90 p. Price: Microfilm-$1.00 - Photostat-$6.00
This manual describes and gives information on installation theory of operation and operation and adjustment of the subject equipment. Major components of the complete equipment are the transmitter unit, automatic motor starter, and a motor-generator set. CW operation only is provided in the frequency ranges 4000-4525, 8000-9050, 12,000-13,575, and 16,000-18,100 kilocycles with an output of 1 Kw. The equipment, intended for ship installation, uses a crystal oscillator. These instructions contain tuning curves, installation, schematic, and wiring diagrams, photographs, and a parts list. Manufacturers instructions for a number of the component parts of this equipment are appended.

PB 17904. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. Installation instructions for panoramic coupling kits for models REU/REV panoramic adaptors for use with models RBB/RBC receivers. (NAVSHIPS 900,501-1B; Radio Corporation of America Instruction Book 38369) Nov 1944. 38 p. Price: Microfilm-50¢ - Photostat-$3.00
This kit consists of two sub-assemblies, (1) a catnode follower assembly, and (2) a low pass filter unit, together with the necessary mounting hardware and cables. When properly installed, the circuits are such as to prevent interaction between the receiver and the panoramic adaptor and to minimize interference from local transmitters. The low pass filter is designed to pass the receiver intermediate frequency (400 kc, ± 100 kc) with minimum attenuation. Included are descriptions of the equipment; instructions for installation, operation and maintenance; lists of parts; photographs; schematic diagram; and drawings. The panoramic coupling kit, type CLP-10335, is manufactured by RCA Victor Division Radio Corporation of America, for the U. S. Navy.

PB 17709. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. Installation instructions TCS noise limiter adapter unit for Navy Model TCS receiving equipment. (Manufactured by U. S. Television Mfg. Corp., New York, N. Y.) (NavShips 900,005-IB) Nov 1943. 3 p. Price: Microfilm-50¢ Photostat-$1.00
This instruction sheet on installation of the TCS noise limiter adapter unit forms a supplement to the instruction book for the TCS receiver. Photographs and wiring diagram are included.

PB 17973. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. Instruction book for diversity radio receiving equipment models RBP-1 and RCP. (NAVSHIPS 900,478; Radio Corporation of America Instruction Book 38244). Mar 1945. 212 p. Price: Microfilm-$2.50 - Photostat-$15.00
The model RBP-1 equipment consists of 2 groups of 3 radio receivers, together with the associated power supply equipment; model RCP equipment consists of one group of 3 radio receivers, together with the associated power supply equipment. Each receiver comprises: (1) A radio frequency system providing selectivity and amplification over a nominal tuning range of 3 to 24 megacycles, (2) an intermediate frequency amplifier system containing the final detector, (3) a signal control panel for switching, combining and monitoring, (4) tone keyers for telegraph service or audio frequency amplifiers. Instructions for the installation, operation and servicing of each unit are given. Parts lists, photographs, drawings, curves, tables, connection and schematic diagrams are included.

PB 17912. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. Instruction book for emergency mobile communication equipment model MAM. (Manufactured by Air-Track Manufacturing Corp., College Park, Md.). (Navships 900,588) Jul 1945. 68 p. Price: Microfilm-$1.00 - Photostat-$5.00
This equipment consists of two transmitter-receiver combinations mounted in a small two wheel trailer and intended for use at airfields. The following units are included in the equipment: The RT-19/ARC-4 airborne radio equipment, a transmitter-receiver which may be pretuned to four crystal controlled frequencies in the 140 to 144 mc band; type 56 Q-1 collins transmitting equipment, COL-52357, a unit in which 4 crystals may be operated on the first, second or fourth harmonic, with master oscillator operation also available, and operating from 1500 to 12,000 kc. in three bands; two navy model RAX-1 receivers covering the range from .2 to 1.5 and from 1.5 to 9 mc. respectively; an engine generator, power supplies, rotary converter and a battery which gives the equipment a completely self-contained power system for all equipment; a control unit and junction box. The instruction book describes the equipment and discusses its installation, theory of operation, operation and maintenance. Parts lists, photographs, wiring diagrams, and schematics are included.

PB 18092. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. Instruction book for model TCC-4 radio telegraph and telephone transmitting equipment (manufactured by Collins Radio Co., Cedar Rapids, Iowa). (NavShips 900,214-IB) Nov 194[illegible] 216 p. Price: Microfilm-$2.50 - Photostat-$15.00
This instruction book covers a transmitting equipment designed for applications involving commercial point-to-point communication, aeronautical ground station, and long distance transoceanic services requiring operation on a number of readily selected frequency channels. The equipment is composed of two cabinets or bays and a remote operator's control unit. The frequency range of this equipment is 2000 kc to 18,000 kc. The antenna network is designed to match an unbalanced resistive load of from 70 to 600 ohms at a phase angle of not more than 60°. The nominal rated power output of the TCC transmitter is 1000 watts telegraph and 600 watts modulated telegraph or telephone. The book contains curves, wiring diagrams, photographs, spare parts list, and drawings.

PB 17462. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. Instruction book for Navy model TBK-19, radio-telegraph transmitting equipment. (NAVSHIPS 900,482; RCA Instruction Book 38268) Feb 1945. 222 p. Price: Microfilm-$2.50 - Photostat-$15.00
Subject equipment, manufactured by RCA Victor Division, Radio Corporation of America, has been designed for use on all types of naval vessels except certain types of submarines. It consists essentially of a radio-transmitter unit, a motor generator unit, and a magnetic control unit. The installation, operation and maintenance of the above mentioned equipment is the subject matter contained in this instruction book. The auxiliary equipment required for complete operation of the radio-transmitter is not supplied with the radio transmitting equipment, but consists of an antenna and a remote control panel. The transmitter has a nominal power output of 500 watts, the actual output will vary somewhat with the frequency and the type of antenna employed. By manipulation of the high voltage generator field rheostat, located on the front panel of the transmitter unit, the output may be varied from full power down to one-quarter power. CW operation only is provided for; phone or MCW operation is not available. The keying system will provide satisfactory service at speeds up to 100 words per minute. The transmitter unit can be operated on any frequency from 2000 to 18,100 kc. The equipment can be started, stopped and keyed using either a four-wire or a six-wire remote control system. Book contains lists of equipment supplied, description of equipment, installation, operation and maintenance instructions, and parts and spare parts lists. Photographs and drawings are included.

PB 18003. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. Instruction book for Navy model TDD-2, radio telephone transmitting equipment. (Manufactured by Communications Company, Inc. Coral Gables, Fla.) (NavShips 900,271-IB). Oct 1943. 50 p. Price: Microfilm-50¢ - Photostat-$4.00
This is a complete, cabinet mounted, low frequency transmitter, used for airport control operation where approximately 15 watts antenna output is required. The frequency range is from 200 to 550 kcs, and emission is A-3. The equipment is designed for press-to-talk operation from a local microphone handset, or from a remote point, by a single telephone line. The operating frequency is established by crystal control and the equipment operates from a standard 115 volt, 60 cycle, single phase, alternating current source. The instructions cover descriptions of the various parts, installation, operation, tuning procedure, and include lists of parts, photographs, drawings, schematic wiring diagrams, and curves.

PB 18098. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. Instruction book for panoramic radio adaptor Model RBB (manufactured by Panoramic Radio Corp., New York, N.Y.). (NAVSHIPS 900,513 IB). Dec 1944. 83 p. Price: Microfilm-$1.00 - Photostat-$6.00
Navy model RBB (new nomenclature for model RDK-1 and supercedes model RDK, 3 Mc bandwidth) Type CPM-55155 panoramic radio adaptor when connected to the proper radio receiver, enables the operator to see, on a screen, all stations re-

ceivable within a 6 Mc band of the station to which he is listening, 3 Mc above and below. The peaks represent signals or stations from these can be told the frequency, strength and character of the signal and the type of modulation. This receiver shows where the clear spots are so that a transmitter can go on the air without any interference. Detailed description, terms and definitions, electrical characteristics, installation, maintenance together with photographs, drawings, diagrams and tables make up this book of instructions.

PB 17977. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. Instruction book for radio receiving equipment Model RBO. Mar 1942. 63 p. Price: Microfilm-$1.00 - Photostat-$5.00
This receiving equipment is suitable for use aboard naval vessels or at naval radio shore stations. It covers the frequency ranges of 0.54 to 1.60 and 5.55 to 15.60 mc in three frequency bands. It is designed to provide optimum performance and high quality reception of voice or tone modulated radio frequency signals, on all frequency bands, by head telephone or loud speaker methods. It is designed for a-c operation, being equipped with a self-contained rectifier type power supply for supplying all operating voltages required from an a-c source of 110/125 volts, 58/62 cycles, single phase. Parts lists, photographs and a schematic diagram are included. This equipment was supplied by E. H. Scott Radio Laboratories, Inc., Chicago, Illinois.

PB 17975. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. Instruction book for radio receiving equipment Model RBO-2; and supplement 1, dated Nov 1945. n.d. 74 p. Price: Microfilm-$1.00 - Photostat-$5.00
The Model RBO-2 equipment manufactured by E. H. Scott Radio Laboratories, Inc., Chicago, is intended for use aboard Naval vessels of all types and at Naval radio shore stations. The receiving equipment is a 12-tube superheterodyne and the frequency ranges of 0.53 to 1.60 and 5.55 to 15.60 mc in three frequency bands. It provides optimum performance on voice or tone modulated radio frequency signals by head telephone or loud speaker methods. No beat frequency oscillator for the reception of radio telegraph signals is provided. It is designed for a-c operation from a source of 115 volts, 60 cycles, single phase. Parts lists, photographs, test data, and a schematic diagram are included. Supplement 1 is a revised parts list, dated November 15, 1945, bearing the series number "NAVSHIPS 900,610-1".

PB 17798. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. Instruction book for radio receiving equipments Navy models RBB/RBC, RBB-1/RBC-1, RBB-2/RBC-2. (NAVSHIPS 900,477; RCA Instruction Books 38094/38094-1/38216/38269) Apr 1945. 196 p. Price: Microfilm-$2.00 - Photostat-$14.00
The RBB and RBC receivers, designed for operation aboard all types of Naval vessels and at Naval radio shore stations are similar in construction, employing as many common components and sub-assemblies as is suitable with the different frequency coverages. The range of RBB is A5 to 4.0 mc; the range of RBC is 4.0 + 27.0 mc. These equipments operate directly from a 110-, 115-, or 120-volt, 60 cycle power supply. Each equipment is capable of furnishing a maximum undistorted power output of 15 milliwatts to each of one to 20 pairs of 600-ohm (impedance) telephone receivers connected in parallel or equivalent load. Each receiver unit consists of two sub-assemblies which are bolted together and housed in a single cabinet. One of these sub-assemblies contains a preselector (r-f) unit; the other sub-assembly houses the intermediate-frequency/audio-frequency unit. The i-f/a-f units (except for an a-f band-pass filter) are the same for both equipments. The preselector unit contains the controls and circuits necessary for selection of the desired radio frequency signal and for heterodyning this signal down to the intermediate frequency. This book contains sections covering general description, installation, operation, theory of operation, maintenance, and parts list. Tables, drawings and photographs are included. The contractor is RCA Victor Division of Radio Corporation of America.

PB 17469. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. Instruction book for radio telephone and telegraph transmitting and receiving equipment, Navy Model TCS-6, and supplement 1, dated 12 Jan 46. (NAVSHIPS 900,269-IB, and NAVSHIPS 900,269-IB-1) Aug 1944. 142 p. Price: Microfilm-$1.50 - Photostat-$10.00
Subject equipment is a complete radio transmitting and receiving installation, designed for use in mobile and portable services such as motor boats, cars, trucks, ambulances, tanks, and other services where severe vibration and shock may be encountered. The transmitter employs an oscillator-buffer-final amplifier circuit with provisions for the emission of either CW or voice-amplitude-modulated signals. The frequency range, 1.5 megacycles to 12 megacycles is covered in 3 bands. The frequency response of the transmitter is uniform within plus or minus 5 db over the audio range of 300 to 3000 cycles. Carrier emission is 10 watts for voice and 25 watts for CW. The audio-frequency distortion is less than 10 percent rms, measured with 90 percent modulation at 400 cycles. This book contains sections covering general description of the equipment, theory of operation, installation, adjustment and operation, maintenance and service, supplementary power supplies, parts and spare parts list, color codes, coil winding drawings and data, schematics, photographs and practical wiring diagrams. Supplement consists of revised parts list for the subject equipment. The equipment was manufactured by Air King Products Co., Inc., and Hamilton Radio Corporation for the contractor, Hazeltine Electronics Corporation.

PB 17965. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. Instruction book for radio telephone and telegraph transmitter and receiving equipment, Navy model TCS-8. (NAVSHIPS 900, 576-IB) Mar 1945. 293 p. Price: Microfilm-$3.00 - Photostat-$20.00
The model TCS-8 equipment, manufactured by Stewart-Warner Corporation, Chicago, Illinois, consisting of a transmitter unit, a receiver unit, a power unit, a remote control unit, and antenna loading coil unit, interconnecting cables and accessories, is a complete radio transmitting and receiving installation designed for use in portable and mobile services, such as trucks, tanks and motor boats where severe vibration and shock may be encountered. The transmitter employs an oscillator-buffer-amplifier circuit with provision for operation on any one of four crystal controlled frequencies (1500 to 12,000 kc), or continuous coverage with master oscillator operation. The power output is 20 watts on voice and 40 watts on CW. The receiver employs a sensitive superheterodyne circuit designed to cover the same range as the transmitter. Detailed description of the equipment and its functional characteristics; instructions for installation, operation and adjustments; tables giving performance data, etc; photographs; schematics, diagrams; and Supplement No. 1 to the instruction book are included.

PB 18050. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. Instructions for the installation and operation of model MBM radio transmitting and receiving equipment. (Manufactured by Jefferson-Travis Radio Mfg. Corp. New York, N.Y.). (NAVSHIPS - 900,581). n.d. 66 p. Price: Microfilm-$1.00 - Photostat-$5.00
This manual contains a description of Model MBM portable radio transmitting and receiving equipment, with instructions for its installation, operation, adjustment, and maintenance. Photographs and circuit diagrams are included as well as an electrical parts list. This equipment operates in the range from 4 to 14 Mc with a power output of from 6½ to 20 watts. Receiver tuning is continuous in two bands, while the transmitter is crystal controlled. Power for this transceiver is supplied from a vibrator type power supply operating from self-contained storage batteries or from a hand generator.

PB 18002. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. Instruction book model TCP-1 and model TCP radio-telephone equipment. (Manufactured by Radiomarine Corporations of America, 75 Varick St. N.Y.). (And addendum dated 27 Jun 42). Jun 1941. 100 p. Price: Microfilm-$1.00 - Photostat-$7.00

This handbook contains instruction relative to operating, installing, adjusting and maintaining the model TCP-radiotelephone. The equipment comprises a compact medium power radiotelephone transmitter and receiver. The transmitter delivers 75 watts of carrier power into a typical 16 ohm, 200 mmfd. antenna. The modulation capability is substantially 100 per cent. The transmitter and receiver are designed to cover the frequency range of 2000 to 3000 kc. There is provision for the use of a maximum of ten crystal-controlled frequencies within this band. Labeled photographs, drawings, and charts illustrate the handbook. Schematic diagrams of transmitter and receiver and a parts list are included.

PB 17972. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. Instructions: Navy model RBP diversity radio receiving equipment. (Manufactured by RCA, Victor Div. of Radio Corp. of America, Camden, N. J.) Sep 1942. 214 p. Price: Microfilm-$2.50 - Photostat-$15.00
This equipment consists of two groups of three radio receivers together with the associated power-supply equipment. The equipment is mounted on seven cabinet racks, assembled in a row, with a power-supply rack mounted in the center. On the theory that a signal will not always fade simultaneously at two points spaced even a few wave lengths apart this system combines the outputs of three receivers fed from antennas spaced approximately 1000 feet apart. This equipment functions as two independent single group diversity radio receivers mounted side by side. These groups have a tuning range from 3 to 24 mc in three bands and will receive radio telegraph or telephone signals. The manual describes each component of the equipment and provides instructions for its operation and servicing. The text includes complete parts lists, installation drawings, labeled photographs, and schematics.

PB 18057. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. Preliminary instruction book for Navy model TAJ-19 radio telegraph transmitting equipment. (Manufactured by General Electric Company, Schenectady, N.Y.). (GIE-19628). Sep 1943. 127 p. Price: Microfilm-$1.50 - Photostat-$9.00
The Navy model TAJ-19 radio telegraph transmitting equipment is designed primarily for service on vessels of the U. S. Navy where a compact, medium power radio transmitter is required. It is capable of continuously variable adjustment to, and operation at, any frequency in the specified frequency range, 175-600 kc, with a nominal power output of 500 watts. In addition to installation, operation and maintenance instructions, this manual contains parts lists, schematics, drawings, and a set of commercial bulletins describing components of the equipment.

PB 17987. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. Preliminary instruction book for radio transmitting equipment, Navy model TCZ-1. (NAVSHIPS 900, 481-1B) n. d. 301 p. Price: Microfilm-$3.50 - Photostat-$21.00
The shipboard transmitting equipment covered by this instruction book consists of a transmitter, an antenna load coil unit, a remote control unit, an antenna shunt capacitor, a power supply unit, and the necessary inter-connecting cables. Use of eleven preset frequencies is possible through the use of an autotune system. The equipment has a frequency range of 200 to 1500 kc and 2000 to 18,000 kc. Emission: Voice, CW, MCW, operates on 110/115 v 50/60 cps, single phase. Power output varies from 18 to 90 watts. The data covered by the text are: General description, installation and adjustment, operation, theory of operation, maintenance, parts and spare parts lists. Photographs, drawings and schematic diagram are attached. The manufacturer is Collins Radio Company, Cedar Rapids, Iowa.

PB 20325. U. S. WAR DEPARTMENT. SIGNAL CORPS. Italian radio set RF 3 M. (Allied Forces Equipment Intelligence Service Rept 35) Mar 1944. 17 p. Price: Microfilm-50¢ - Photostat-$2.00
The RF3M is a medium frequency radio set, range 1700-2880 kc, of low power and is designed for tank operation. The power supply uses a dynamotor unit which is operated from the 12-volt tank battery. The three main components - the transmitter, the receiver, and the power supply - are provided with separate containers. In addition there are three other components in the tank: namely, the interphone box for the tank commander, the interphone box for the driver, and the calibrating oscillator box. Interconnecting cables between these are permanently installed in the tank. Electrically, the set comprises a two-stage transmitter, consisting of a Hartley type oscillator using a 6T tube and an r-f amplifier consisting of two 6TP tubes; an eight tube superheterodyne receiver; and two dynamotors. Photographs, panel sketches, parts list and circuit diagram follow the description.

PB 18018. RCA VICTOR COMPANY, INC., CAMDEN, N. J. Model RAE diversity receiving equipment. (Instruction Book 23244) Jun 1932. 79 p. Price: Microfilm-$1.00 - Photostat-$6.00
These instructions cover the installation, operation, and servicing of the model RAE diversity receiving equipments. The receiving equipment proper (radio frequency tuner and IF-AF amplifier) is identical with model RAB receiving equipment. The instruction book for that equipment (IB-23207) forms a part of the instructions for this model RAE equipment. The diversity equipment minimizes fading by the use of three directional antenna systems, connected to the receivers by balanced transmission lines. A signal is selected from the receiving channel producing the highest output. The equipments (with the exception of the line amplifier, CRV-50009) are designed for operation from a 220-volt, 60-cycle, single-phase supply line. The line amplifier operates from a 110-volt, 60-cycle supply. The total power consumption of the complete equipment is approximately 2 KW. Each line amplifier, type CRV-50009, requires approximately 175 watts. The model RAB radio receiving equipment is of the superheterodyne type covering the frequency range of 1,000 to 30,000 kc and is designed for the reception of pure, modulated or interrupted CW or damped waves, or telephone modulated radio frequency signals. The output circuit is designed for use with from one to four pairs of 600 ohm (impedance) telephone receivers connected in parallel. Tables, photographs, diagrams, and schematic diagrams are included.

PB 17978. WELLS-GARDNER & CO., CHICAGO, ILLINOIS. Preliminary instruction book for Navy model ARL-4 radio receiving equipment. 1943. 63 p. Price: Microfilm-$1.00 - Photostat-$5.00
The model RBL-4 radio receiver employs 7 tubes, in a tuned radio frequency circuit with a regenerative type detector and covers in six bands the frequency range of 15-600 kc. It is suitable for reception of either radio telephone (MCW) or radio telegraph (C-W or ICW) signals, and may be used either at Naval Shore Stations or aboard Naval vessels. It is designed to operate on either a 115 or 230 volt 50-60 cycle power supply, or a battery power supply. Photographs, drawings and block and schematic diagrams are included together with description, unpacking, installation, operation and maintenance instructions.

PB 17900. WESTERN ELECTRIC COMPANY. Preliminary instruction book for Navy model RBQ radio receiving equipment. Sep 1942. 139 p. Price: Microfilm-$1.50 - Photostat-$10.00
The model RBQ radio receiving equipment is the assembly of apparatus that makes up the radio-receiving terminal of a point-to-point ultra high-frequency radio link. There are two major units, the rack-mounted, single-frequency superheterodyne radio receiver and the test oscillator. The frequency range is 132 to 156 mc. The instruction book is divided into 10 sections - General description, description of major units, installation, construction, circuit description, operation, maintenance and trouble location, test data, adjustment of the 239 JE relay, S1, and apparatus list. The attachments consist of drawings, outlines, diagrams, and schematic diagrams.

PB 18106. WESTERN ELECTRIC COMPANY. Radio receiver type CW46037, instruction book. (Manufactured by Western Electric Co.). (I.B. 748) Feb 1934. 50 p. Price: Microfilm-50¢ - Photostat-$4.00

This instruction book covers installation, operation, and maintenance of type CW46037 ultra high frequency radio receiver developed by the Bell Telephone Laboratories for the Western Electric Company to meet the requirements of the Navy. The receiver is designed as part of the model UB equipment to key simultaneously five transmitters at Annapolis, Maryland from Washington D. C. A superheteroiyne type of circuit has been employed in order to obtain a high degree of sensitivity and selectivity. In addition, particular care has been taken in the design of the receiver to insure low overall distortion. The receiver covers the frequency band from 27,000 to 40,000 kilocycles and may be adjusted to any one frequency in this band. The receiver consists essentially of a stage of tuned radio frequency amplification, a first detector, a crystal controlled oscillator, a three stage intermediate frequency amplifier, a second detector, automatic gain control, and first audio frequency amplifier stage, a push pull output stage, and a rectifier stage. The receiver is designed to operate from a 50 to 60 cycle AC power source, at any voltage between 70 to 130 volts. The power consumption is approximately 100 watts. The instruction book contains photographs, wiring diagrams, curves, detail drawings, and a parts list.

PB 17984. WESTINGHOUSE ELECTRIC AND MANUFACTURING COMPANY. Instruction book and drawings for Navy model TAY-1, radio telegraph transmitting equipment. Feb 1934. 112 p. Price: Microfilm-$1.50 - Photostat-$8.00
This equipment is designed to effect communication in the 300 to 600 kc band with precision and reliability, without the necessity of preliminary calling. It may be controlled locally or remotely. It has a nominal power output of 200 watts. Either CW or MCW is available as desired. The text covers installation, operation, maintenance, parts list, spare parts, with complete drawings, outlines, diagrams, schematic diagrams, graphs, and tables.

PB 17986. WESTINGHOUSE ELECTRIC AND MANUFACTURING COMPANY. Instruction book and drawings for Navy model TBK-5, radio telegraph transmitting equipment. Mar 1936. 180 p. Price: Microfilm-$2.00 - Photostat-$12.00
This instruction book covers a radio transmitter designed for shipboard installation. It consists of a radio transmitter unit, a motor generator unit, and a motor starter. The transmitter unit is a single frame assembly including the necessary electrical circuits, tubes, and control apparatus for taking power from a motor generator unit and delivering telegraphically keyed CW radio frequency energy to an antenna. The nominal radio frequency output is 500 watts and the frequency range 2000 to 18,000 kc. The power output may be varied from full power to a minimum of 25% by means of a generator field rheostat on the radio transmitter unit. Telegraph keying speeds up to 100 words per minute may be utilized. Provisions are made for low power operation with a nominal output of 75 watts in the frequency range 2000 to 9050 kc CW. The instruction book gives detailed information on installation, operation and maintenance and contains schematic and wiring diagrams, curves, tables, drawings, photographs, spare partslists, and bill of material.

PB 17476. WESTINGHOUSE ELECTRIC AND MANUFACTURING COMPANY. Instruction book and drawings for Navy model TBN-3, radio telegraph & telephone transmitting equipment. (Instruction book 5783) Oct 1934. 314 p. Price: Microfilm-$3.50 - Photostat-$21.00
The complete TBN transmitting equipment for use afloat comprises the following component units: Rectifier-modulator unit; high frequency transmitter unit; intermediate transmitter unit; and single channel speech input equipment. The intermediate frequency unit has a range from 300 to 2000 kc, an output of 1000 watts, and CW and MCW emission; the high frequency unit has a range of 2000 to 18,100 kc, an output of 500 watts, and CW, MCW, and voice emission. Instructions for installation, operation, and maintenance for each unit are given in separate sections of this book. Suitable switching facilities are provided to permit alternate operation of either transmitter unit from the common rectifier unit. Photographs and diagrams are included. Changes in the equipment are listed in modifications dated January and November 1937. The equipment was manufactured for the U. S. Navy Department, Bureau of Engineering.

PB 17803. WESTINGHOUSE ELECTRIC AND MANUFACTURING COMPANY. Instruction book: Navy Model TAH-2 intermediate and high frequency radio telegraph transmitting equipment; output 200 Watts. (Instruction Book 5639) Jun 1930. 89 p. Price: Microfilm-$1.00 - Photostat-$4.00
This equipment is designed for installation on certain classes of submarines. Power is taken from a 120 volt or 230 volt d-c. ship's power supply. Frequency range 300 to 600 kc (CW - MCW), and 4,000 to 18,100 kc (CW). Output is 200 watts. Topics covered in the instructions are: General description, intermediate frequency transmitter, high frequency transmitter, filter unit, power equipment, vacuum tubes, installation and maintenance, spare parts and emergency repair, and crystal frequency indicator, Navy type CA1-3942. Diagrams and photographs are included.

PB 17701. WESTINGHOUSE ELECTRIC AND MANUFACTURING CO. Instructions for installation of replacement heater relay panel in radio transmitting equipment Models TBK-5 and TBK-6. Oct 1941. 22 p. Price: Microfilm-50¢ - Photostat-$2.00
Instructions are given for installation of a heater control circuit of improved design to replace the master oscillator heater relay panel in the TBK-5 and TBK-6 transmitters, manufactured for the Navy Department. Modifications in the instruction book for this equipment are also listed. Schematic diagrams are attached.

PB 17702. WESTINGHOUSE ELECTRIC AND MANUFACTURING COMPANY. Model TAV-2 portable radio equipment; Instruction book. (Instruction Book 5684) Jul 1933. 159 p.
Price: Microfilm-$2.00 - Photostat-$11.00
Subject equipment consists of a 20 watt CW transmitter, operating on frequencies between 2000 and 4525 kilocycles, a receiver capable of reception of CW and MCW signals within the frequency ranges of 300 to 600 and 2000 to 4525 kilocycles and all additional equipment required for satisfactory operation in the field. Each unit is supplied with a cover of waterproof canvas which is easily removed for operation. The fastening straps of this cover are so arranged that they may be used for transporting the unit by hand either on the back of a man or supported from sections of the antenna mast and carried on the shoulders of two men. The book contains sections covering general description of the equipment, installation and packing, operation, maintenance and lubrication. Photographs and graphs are included, also instruction sheet and booklet from Briggs & Stratton Corp. for operating their model FJ-1 motor. Drawing list itemizes 25 separate diagrams, spare parts and specification sheets that accompany the instruction book. The equipment was manufactured for the Navy Department, Bureau of Engineering.

PB 17783. WESTINGHOUSE ELECTRIC AND MANUFACTURING COMPANY. Navy Model TAJ-5 radio telegraph transmitting equipment: Instruction book. (Instruction Book 5727) May 1934. 106 p. Price: Microfilm-$1.50 - Photostat-$7.00
Subject equipment is designed to meet the requirements of destroyers, light cruisers and other types of Navy vessels involving similar radio requirements. The design of the transmitter is based on the master oscillator power amplifier principle. The keying system provides for break-in operation and is designed for satisfactory service up to 100 words per minute. The power output may be varied from full power to a minimum value of 25 percent by means of a single control on the front panel of the rectifier. This equipment is designed for operation on a 440 volt 3 phase 60 cycle supply and requires 2.65 KW for full power operation key locked. The transmitter operates at any frequency in the band of 175 to 600 kcs. The power output is nominally 500 watts. CW and MCW emission is provided. The book contains sections covering description, installation, operation, maintenance, parts list and commercial bulletins on accessory equipment. In addition to the photographs and drawings presented in the instruction book, there are a number of schematic diagrams accompanying it.

PB 19475. WESTINGHOUSE ELECTRIC AND MANUFACTURING COMPANY. Navy model TBP, Ultra-portable ultra high frequency transmitting-receiving equipment. (Instruction Book 7037) Oct 1936. 64 p. Price: Microfilm-$1.00 - Photostat-$5.00
This instruction book describes equipment which provides two-way communication by either voice or MCW telegraphy on any one of 75 different channels throughout the frequency range of 28 to 65 mc. Nominal power output is 0.5 watts. The equipment is complete in all details, including battery power supply and antenna. It is designed for transportation as a knapsack load, and may be operated by one man while it is being carried on his back. The circuits of the transmitter-receiver unit consist of: (1) Transmitter R. F. section; (2) receiver R. F. section; (c) audio amplifier section; and (d) crystal calibration section. Parts lists, photographs, and diagrams are included. This equipment was manufactured for the Bureau of Ships, Navy Department.

Electronics

German

PB 2184. DOCUMENTS and equipment obtained during investigation of German X-ray and associated industries. C.H.F. Müller, A. G.; 17 proposed patent applications in the X-ray and electrical fields. 1944-1945. 60 p. Price: Microfilm-$1.00 - Photostat-$4.00
Photostats of proposed patents with diagrams, ranging from Feb 4, 1944 to Mar 10, 1945: 1. "Strahlentransformator"; X-ray transformer. 2. "Kathode für Drehanodenröntgenröhren", No. A2333, dated March 10, 1943 (?); cathodes for X-ray tubes with rotating anodes. 3. "Röntgenröhrenbehälter", No. 3278, dated March 1, 1945; container for X-ray tubes. 4. "Thermostreifen", No. A3226, dated Sept 26, 1944; bimetallic thermo strips for electric switches. 5. "Ausdehnungskörper für Oelhaube", No. A 3225, dated Sept 26, 1944; expansion substances for oil caps for containers of X-ray tubes. 6. "Oelhaube für Langanoden-Röntgenröhren", No. 3227, dated Sept 26, 1944; oil caps for X-ray tubes with long anodes. 7. "Strahlentransformator", dated Hamburg-Fu., Nov. 16, 1944; X-ray transformer. 8. "Strahlentransformator", dated May (?) 1944; X-ray transformer. 9. "Einrichtung zum Giessen von Metallteilen, insbesondere Röntgenanoden", No. A2858, dated Jan 10, 1944; arrangement for casting of metal parts, especially for X-ray anodes. 10. "Strahlentransformator" given the patent classification M 159 F 15/VIII c/21g on March 1, 1944; X-ray transformer. 11. "Strahlentransformator" given the classification M 159 F14/VIII c/21g on March 1, 1944; X-ray transformer. 12. "Röhrenschutzhülle für Röntgenröhren", No. 3228, dated May ? 1944, this being perhaps only an approximation of the title and number since the reproduction is faulty; caps for X-ray tubes. 13. "Elektrische Sicherung", No. A 3072, dated April 24, 1944; electrical safety devices. 14. "Strahlentransformator", additional application to M 159 065 VIII 10 21g, apparently receiving the classification M 159 F41 VIII c/21g, dated March 4, 1944; X-ray transformer. 15. "Röntgenröhre mit kleinem Brennfleck", No. A 2924, dated Feb. 4, 1944; X-ray tube with small focus spot. 16. "Filmkassette zur Aufnahme belichteter Filme", No. A 3071, dated April 24, 1944; film container for holding exposed film. 17. "Strahlentransformator" given the classification M 159 F 42 VIII c/21g on March 6, 1944; X-ray transformer. A few of these documents will photograph poorly, and others lack the diagrams which should accompany them.

PB 20089. DYER, CARLETON and others. The radio valve and lamp industry in Vienna. (BIOS Final Rept 248, Items 1, 7). Nov 1945. 22 p. Price: Microfilm-50¢ - Photostat-$2.00
This report gives the findings of the investigators who visited various factories which manufactured electric lamps, radio valves, and radio equipment in Vienna. The factories visited at this time were: (1) Schrak-Ericsson, manufacturer of telephone and telegraph equipment, railway signal equipment, and some radio equipment and tubes Siemens-Halske, manufacturer of radio tubes; Radiowerke A.G.; Osram, Fleischmarkt, manufacturer of light bulbs; Kapsch und Söhne, manufacturer of telephone and telegraph equipment, small portable radio transmitter-receivers, condensers, and dry batteries; Watt Glulampen-Fabrik, manufacturer of light bulbs; Elin & Schorch A.G., manufacturer of light bulbs; Langfelder & Putzker, manufacturer of Edison screw caps; Minerva radio - W. Wohleven & Co.; Modek & Schörner, making precision electro-mechanical equipment; Mix & Genest; and Radio-Fabrik, Ingelen. Practically the entire electrical and radio industry of Austria is situated in Vienna. The industry under review suffered considerably because of removal of plants by the Russians and because of bomb damage. Nothing of scientific or technical interest was uncovered except for a somewhat interesting range of small electrolytic condensers made by Phillips which was discovered at Radiowerke A.G. Brief information on these condensers is given herein. In this section on Siemens-Halske there is a description of the development of values for high frequency use, particularly for magnetrons and klystrons. Diagrams are included of 100 W.C.W. klystron, sealing technique on L. G. klystrons and constructional features of L.D. 25.

PB 8650. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.b.H., Berlin. Anordnung zur räumlichen Peilung. (A design for spaced-antenna direction-finding). German patent 934/41, applied for May 4, 1940 with number T53711 VIII a/21a4. Original inventors: Dziewior, Schütz. An addition to patent application T53421 VIII a/21a4. No illustrations. 1940. 5 p. Price: Microfilm-50¢ - Photostat-$1.00

PB 8548. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.b.H., Berlin. Anordnung zur Storbeseitigung durch Kompensation. (An arrangement for elimination of interference by means of compensation). German patent 720739 applied for Dec 12 1939 with number T53204 VIII a/21a4. Original inventor: Bouche. 1939. 5 p. Price: Microfilm-50¢ - Photostat-$1.00

PB 8652. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.b.H., Berlin. Direkt anzeigender Peiler. (A direct indicating direction-finder). German patent 719657 applied for May 14, 1940 with number T53754 VIII a/21a4, original inventor Kümmich. 1940. 8 p. Price: Microfilm-50¢ - Photostat-$1.00

PB 8692. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.b.H., Berlin. Dynamischer Lautsprecher mit Metallschwingspulenkörper. (Dynamic speaker with a metal voice coil form). German patent 732959 applied for July 27, 1940, with number T54058 VIII a/21a2. Original inventor: Sawade. 1940. 5 p. Price: Microfilm-50¢ - Photostat-$1.00

PB 8677. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.b.H., Berlin. Halterung fur Magnetronröhren. (Mounting for magnetron tubes) German patent 742389 applied for July 12, 1940, with number T54004 VIII c/21g. Original inventor: Paschke. 1940. 6 p. Price: Microfilm-50¢ - Photostat-$1.00

PB 10999. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.b.H., Berlin. Hochfrequenzkontaktvorrichtung. (A high-frequency contact arrangement) German Patent. App. T60179 VIII a/21a4 applied for Mar 2, 1944 and still pending. Original inventors Brühl, Lauer. 1944. 4 p. Price: Microfilm-50¢ - Photostat-$1.00
This document will not reproduce well.

PB 9252. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.b.H., Berlin. Kontaktvorrichtung für koaxiale hochfrequenzleiter. (A connector for high frequency coaxial cable). German patent application Jan. 19, 1945, still pending. Telefunken No. 8892. Original inventor: Dr. Buerck, 1945. 2 p. Price: Microfilm-50¢ - Photostat-$1.00
Illustration missing.

PB 8541. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Lautsprecher für grosse leistungen (A loud speaker for large outputs). German patent 732299 applied for Apr 25, 1940 with number T53694 VIII a/21a2, an addition to patent application T51174 VIII a/21a2. Original inventor: Benecke. 1940. 4 p. Price: Microfilm - 50¢ - Photostat - $1.00

PB 8544. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.b.H., Berlin. Mechanisch-elektronisches Fernsehgerat. (A mechanical-electronic television device). German patent 894/43 applied for Dec 7 1939 with number T53164 VIII a/21a1. Original inventor: Schröter. 1939. 5 p. Price: Microfilm-50¢ - Photostat-$1.00
An addition to German patent 734779, PB 8539.

PB 8676. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.b.H., Berlin. Peilantennensystem. (A direction finding antenna system). German patent 720836 applied for July 10, 1940, with number T53990. Original inventor: Dr. Runge. 1940. 5 p. Price: Microfilm-50¢ - Photostat-$1.00

PB 8653. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.b.H., Berlin. Peiler mit direkter ozzillographischer Anzeige. (A direction finder with a direct indicating oscilloscope). German patent 734484 applied for May 18, 1940 with number T53769 VIII a/21a4. Original inventor: Reichardt. 1940. 12 p. Price: Microfilm-50¢ - Photostat-$1.00
(Incomplete description - one page missing)

PB 8644. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.b.H., Berlin. Peilseitenschalter. (An antenna switch for a direction finder). German Patent 726875 applied for Apr 29, 1940 with number T53708 VIII a/21a4. Original inventors: Volk, Prange. 1940. 10 p. Price: Microfilm-50¢ - Photostat-$1.00

PB 8656. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.b.H., Berlin. Peilseitenschalter. (An antenna switch for a direction finder). German patent 726876 applied for May 24, 1940 with number T53798 VIII a/21a4. Original inventor: Magnth. 1940. 9 p. Price: Microfilm-50¢ - Photostat-$1.00

PB 8830. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.b.H., Berlin. Peilseitenschalter. (An antenna switch for a direction finder) German patent 737078 applied for Apr 71941 with number T55263 VIII a/21a4; Original inventor: Drechsel. An addition to patent application T54439 VIII a/21a4. 1941. 6 p. Price: Microfilm-50¢ - Photostat-$1.00

PB 8679. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.b.H., Berlin. Ringgoniometer. (A ring-shaped goniometer). German patent application 729195 applied for July 16, 1940 with number T54019 VIII a/21a4. Addition to patent T49552 VIII a/21a4. Original inventor: Bihe. 1940. 5 p. Price: Microfilm-50¢ - Photostat-$1.00

PB 8640. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.b.H., Berlin. Schallfänger für Reflektormikrophone. (Sound box for a reflector microphone). German patent 714792 applied for Apr 22 1940 with number T53674 VIII a/21a2 Addition to patent application T53384 VIII a/21a2. Original inventor: Thomsen. 1940. 4 p. Price: Microfilm-50¢ - Photostat-$1.00

PB 8654. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.b.H., Berlin. Schaltungsanordnung zur Frequenzmessung. (A circuit arrangement for frequency measurement) German patent 718478 applied for May 20, 1940 with number T53784 original inventor: Buschbeck. Drawing only. 1940. 1 p. Price: Microfilm-50¢ - Photostat-$1.00

PB 8852. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.B.H., BERLIN. Speicherfläche für fernbildempfang (An accumulating surface for television reception). German patent application T56764 VIIIa/21a1 applied for June 20, 1941 and still pending. Original inventor: Schröter. 1941. 9 p. Price: Microfilm-50¢ - Photostat-$1.00
This invention deals with a screen for a cathode ray tube.

PB 8516. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.b.H., Berlin. Transformator für Gegentakt-B-Verstärker. (A transformer for a class B push pull amplifier). German patent 726259 applied for Oct 23 1939 with number T52971 VIII a/21a2. Original inventor: Gurtler. 1939. 9 p. Price: Microfilm-50¢ - Photostat-$1.00

PB 8648. TELEFUNKEN GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M.b.H., Berlin. Verfahren zur Eichung einer Skala. (Procedure for calibrating a scale). German patent 727572 applied for April 30, 1940 with number T53714 VIII a/21a4. Original inventor: Thom. 1940. 9 p. Price: Microfilm-50¢ - Photostat-$1.00

PB 20536. THIESSEN, G. J. Acoustics laboratories of the Physikalische Technische Reichsanstalt, Göttingen. (BIOS Final Rept 208, Item 13). Oct 1945. 4 p. Price: Microfilm-50¢ - Photostat-$1.00
The acoustics section of the Physikalische Technische Reichsanstalt (The German Bureau of Standards) was engaged in underwater acoustics. Measurements were made of ships' noises from near zero frequency to about 160 ks. with hydrophones laid on the bottom of harbors and the sound output recorded on a pen recorder as the ship passed over the range. From this data isobar diagrams were made of all possible types of ships and the dependence of sound on distance from the source and velocity of the ship was determined. A rough working rule was found to be that the sound pressure doubles every time the velocity increases by 3.3 knots.

PB 20464. THIESSEN, G. J. Non-destructive testing of materials, Siemens-Werner Werk "M", Berlin/Siemensstadt. (BIOS Final Rept 214, Item 9). n.d. 4 p. Price: Microfilm-50¢ - Photostat-$1.00
Equipment using ultrasonics was developed at the Siemens plant for testing metals for the faults represented by very flat bubbles of air which often occur in rolled metals. The transmitter was of a conventional design using quartz at resonance, at a frequency of 200,000 cycles per second. Receiver consisted of a flat glass jar filled with oil with fine aluminum powder held in suspension. When sound entered the jar a pattern was clearly visible in the particles, indicating whether or not faults were present. Ultrasonics were also used as an aid in soldering or in spot welding fine aluminum wire. A brief discussion of the use of X-rays for testing metals at Siemens is also included.

PB 18619. U. S. ARM: AIR FORCES. AIR TECHNICAL SERVICE COMMAND. ENGINEERING DIVISION. Information on German radio installation in JU-388 airplane. Dec 1945. 38 p. Price: Microfilm-50¢ - Photostat-$3.00
This report consists of photographs pertaining to German radio equipment installed in the JU-388 airplane, Serial No. 560049. The airplane equipment consisted of radio compass, blind approach equipment, liaison communications equipment, command communications equipment, radio actimeter, IFF set, and intercommunications amplifier.

PB 19730. U. S. THIRD ARMY. SIGNAL SECTION. German mine detector, MS-Wien 41, manufactured 1941. (Enemy Equipment Intelligence Service Rept 8-3). Aug 1944. 7 p. Price: Microfilm-50¢ - Photostat-$1.00
This is a portable mine detector which may be carried on the operator's back. The circuit uses a pentode tube with suppressor, screen and plate connected to operate as a triode

audio oscillator. Close proximity of a metal object changes the inductive coupling between the plate and grid coils in the detector head causing the tube to oscillate. This audio oscillation is amplified by three audio amplifier tubes in cascade, and the audio tone is reproduced in the operator's headset. Included also are a wiring diagram, operating instructions and 4 photographs.

PB 20324. U. S. WAR DEPARTMENT. SIGNAL CORPS. German automatic keyer; beacon. (Allied Forces Enemy Equipment Intelligence Service Rept 34) Mar 1944. 10 p. Price: Microfilm-50¢ - Photostat-$1.00
This German automatic keyer is a device used in conjunction with a radio transmitter for automatically keying a pre-arranged direction-finding signal in Morse code. It consists essentially of a rotating disk on which the signal is set, and of accompanying elements by which the speed of the disk and the number of signals transmitted are controlled. An adjunct is a clock, which will cause the signal to be sent at a prearranged time (or times). Photographs and a circuit diagram are included.

PB 20328. U. S. WAR DEPARTMENT. SIGNAL CORPS. German radio controlled tank B-4. (Allied Forces Enemy Equipment Intelligence Service Rept 40) May 1944. 11 p. Price: Microfilm-50¢ - Photostat-$1.00
This report describes the radio apparatus (FF2RA) in the German radio-controlled tank B4 consisting of a superheterodyne radio receiver, frequency 24,600 kc and intermediate frequency 464 kc, and a separate audio filter network. The latter operates an electronic relay system. The vehicle is driven to the point of departure by means of push-buttons on the master control box. At this point the driver dismounts, after having set the master control to the "remote" position. The vehicle is then operated by means of a transmitter which is modulated by various oscillators, or an oscillator having several tuned circuits. Photographs, a parts list and circuit diagrams are appended.

PB 20333. U. S. WAR DEPARTMENT. SIGNAL CORPS. German HF direction finder, Fu Peil-E3. (Allied Forces Enemy Equipment Intelligence Service Rept 50). Nov 1944. 17 p. Price: Microfilm-50¢ - Photostat-$2.00
This is an eleven-tube two-band (190 - 350 kc and 320 - 600 kc) superheterodyne receiver, employing two stages of tuned r-f amplification, a mixer and a local oscillator stage; three stages of i-f amplification, a second detector stage, a BFO stage, a visual-indicator stage employing a vacuum tube and gaseous indicating lamp, and an audio-amplifier stage. This receiver together with a power supply are contained in a single metal case. Replacement of tubes is simplified by use of only one type of tube. It is used for radio direction finding and communication with aircraft and may be operated from commercial alternating current or from A and B batteries. Photographs, parts lists, and circuit diagrams are appended.

Japanese

PB 17530. GIACOLETTO, L. J. Japanese Type 29 Experimental D/F Set. (Ordnance Technical Intelligence Rept 4). Jan 1946. 3 p. Price: Microfilm-50¢ - Photostat-$1.00
The set was experimented with by the Tokorozawa Branch of the Navy Technical Research Laboratory No. 2. It was constructed by Nippon Musen and shows typical German influence of design. It was intended for submarine installation and several submarines were actually equipped with the set while still in the experimental stage. The set covered the nominal frequency range of 115 to 15,000 kc. The Japanese refer to it as a double superhetrodyne, but actually it is a triple I.F. receiver with I.F.'s being automatically switched into the circuit by means of the band changes switch. The antenna employed was a single rotated loop with vertical antenna for sense determination. Aural null was used and typical sensitivty figures were cited. Front and rear view photographs of the set are attached together with a circuit diagram and translated extracts from the Japanese engineering report on the set. It is not believed that this set contains any electronic features of intelligence value. One model of this set (not in perfect condition) is available for further exploitation.

United States

PB 18356. BETHE, H. A. and others. Theoretical results on the T-R box. (NDRC Rept D1:116) Jan 1943. 38 p. Price: Microfilm-50¢ - Photostat-$3.00
Theoretical formulae and graphs are given for a number of quantities relevant for the performance of a TR box. This information permits the calculation of: (1) The resonant frequency from the geometry of the box; (2) the shift of the resonant frequency due to the glass in the TR box and due to the windows; (3) the contribution of the glass and of the windows to the Q-value of the TR box; (4) the shunt impedance referred to the arc gap, in terms of Q; and (5) the power transmitted by "direct coupling" at high level operation. (See also PB 18355).

PB 18342. BETHE, H. A. and others. Transmission of irises in wave guides. (NDRC Contractor's Rept. D-1-111) Nov 1942. 16 p. Price: Microfilm-50¢ - Photostat-$2.00
Irises are metal diaphragms with slits which are used widely in wave guides for "matching," forming resonant cavities, or selecting a definite direction of polarization. This report gives formulas for the susceptance of irises in rectangular wave guides, having a slit going through the whole width or height of the guide.

PB 16885. BOURLAND, L. T. and others. Test of Type P540 radio receiving equipment (manufactured by General Radio Company). (Naval Research Lab Rept R-1839. BuShips Problem X-4-188-A) Jan 1942. 35 p. Price: Microfilm-50¢ - Photostat-$3.00
This equipment includes a receiver unit, tuning units for the ranges 75 to 370 mc and 250 to 1030 mc respectively, and a fixed antenna. Tests were conducted to determine the suitability of the equipment for aircraft installation for Radar intercept work. Mechanical and electrical tests were performed and a flight test conducted. Data is given in tables and graphs. Many objectionable features were found but since this was the only equipment covering this range of frequencies its use during an interim period was considered to be of value. The report includes recommendations for improvement and photographs of the equipment.

PB 18343. CAGE, JOHN M. Development of a stable non-crystal controlled oscillator. (NDRC Rept 14:98) Dec 1942. 7 p. Price: Microfilm-50¢ - Photostat-$1.00
A description is given of an experimental model of a 50 kc non-crystal-controlled oscillator with the extremely low frequency drift of 1 cycle per minute. Circuits of this unit are analyzed and operation of the model is discussed. The report also gives a statement of general causes of frequency drift in feedback oscillators. Schematics are included.

PB 18304. EATON, J. E. and STEINBERGER, JACK. Quarter wave plate for broad band circular polarization. (MIT Radiation Lab Rept 769). Jan 1946. 28 p. Price: Microfilm-50¢ - Photostat-$2.00
It is shown theoretically that there exist stationary values with respect to frequency of the phase shift in a rectangular guide due to a centered quarter wave plate of dielectric. Hence the resulting polarization remains close to circular over a wide range of frequencies. Frequency bands of from 1.7:1 for deviations from circularity of less than 1.06 db to 13:1 for deviations less than ±2.4 db are predicted. Curves are presented for determining the various combinations of parameters involved which will render the phase shift stationary. There are also curves for estimating the guide wave lengths of the two modes whose electric vectors are parallel and perpendicular respectively to the quarter wave plate. Some experimental confirmation of the existence of extrema has been obtained. Graphs and diagrams are included.

PB 20246. ELLEFSON, B. S. and others. Preparation of exponential decay powders and screens ZnF_2:Mn, $ZnMgF_2$:Mn and $MgSiO_3$:Mn. (NDRC Rept 14:379) Jan 1944. 175 p. Price: Microfilm-$2.00 - Photostat-$12.00
Methods are described for the preparation of manganese activated zinc fluoride, zinc magnesium fluoride and magnesium silicate powders and the processing of cathode ray tubes having screens made from these powders. Detailed data are given on original and life test values of the screen characteristics of individual tubes. Compared with ZnF_2: Mn the $ZnMgF_2$:Mn shows a higher time constant for its exponential decay and maintains the characteristics better on life. $MgSiO_3$:Mn is exceptionally stable on life. Experimental data are given in tables and graphs. This study was made for NDRC by Sylvania Electric Products, Inc.

PB 20183. FAUST, WILLIAM R. Resolution of panoramic receivers. (Naval Res Lab Rept R-2749) Jan 1946. 13 p. Price: Microfilm-50¢ - Photostat-$1.00
This report proposes a definition of resolution to be used as standard. An approximate analysis is made of the conditions based on the definition existing in a panoramic receiver which determine the resolution as a function of the receiver and indicator parameters. It is shown that it assumes the correct value in certain limiting cases and so at least is a good approximation to the exact analytic function representing the resolution. This resolution is shown to be

$$H = CF\left[\frac{\Delta f}{F} + \frac{0.293K^2}{T_1 L^2} + \frac{B}{L}\right]$$

which assumes its optimum value when $\Delta f = K\sqrt{F/T_1}$. Diagrams and a graph illustrate the report.

PB 14037. FOSTER, DONALD. Theory and applications of loop antennas. (Harvard Univ. Radio Research Lab Tech Memo 411-TM-123) Jul 1944. 29 p. Price: Microfilm-50¢ - Photostat-$2.00
General formulas for calculating the radiation from antennas in the form of large polygonal loops. Travelling current waves, standing waves, and uniform current are considered and the solution of the problem of the circular antenna with uniform current is treated in detail. Possibility is suggested that the directivity pattern and polarization characteristic of some loop antennas may also be obtained by means of wave guides terminated by horns of proper shape. Equations for the current moment are given, which lead to expressions for the field intensities, the radiation intensity and other properties. Eleven graphs and drawings are included.

PB 17797. GENERAL ELECTRIC COMPANY. Instruction book for Navy model TAJ-7 Radio telegraph transmitting equipment. (GEI-11023A) Jan 1938. 156 p. Price: Microfilm-$2.00 - Photostat-$11.00
The model TAJ-7 radio telegraph equipment is designed primarily for service on vessels where a compact, medium power, intermediate frequency transmitter is required. Nominal output, 500 watts, CW or MCW emission; frequency range 175-600 kc when working into antenna systems described in the instructions. The text has a schematic diagram, wiring diagrams, drawings, and photographs.

PB 19642. GOUCHER, F. S. High power series gaps: Bi-monthly report - Jul and Aug 1944. (NDRC Rept 14:316) Sep 1945. 12 p. Price: Microfilm-50¢ - Photostat-$1.00
This is the first report on a problem which required the development of gaps capable of operating at 21 KV switch voltage into a 50-ohm load at a pulsing rate of 1155 per second and having a pulse of 1 μs duration. This corresponds to a peak power of a little over 2 megawatts. Preliminary work is described and the decision to use mercury cathode tubes is explained. Four tubes are described, two with porous sintered nickel cathodes and one with a porous sintered iron cathode, all three cathodes being impregnated with mercury, and one tube with a liquid mercury cathode. Performance information is given for these units. Two additional reports in this series are PB 19641, bi-monthly report for Nov. and Dec. 1944, and PB 19640, dated Oct. 1, 1946, final report. Graphs are included in this report.

PB 19641. GOUCHER, F. S. High power series gaps: Bimonthly report for Nov and Dec 1944. Case 23385. (NDRC Rept 14:398) Jan 1945. 13 p. Price: Microfilm-50¢ - Photostat-$1.00
This is a progress report of work which was begun as reported in PB 19642 by the same author. The main difficulty encountered during this period was the sputtering of the 80 mil molybdenum anode. Work is described in the addition of low work function materials to the metal powder intended for the anode. This is expected to reduce the sputtering rate. A number of other problems are described and experimental equipment is shown in drawings. Two graphs are also included. The final report of this series is PB 19640.

PB 19640. GOUCHER, F. S. and others. High power series gaps having sintered iron sponge mercury cathodes: Final report. (NDRC Rept 14:488) Oct 1945. 112 p. Price: Microfilm-$1.50 - Photostat-$8.00
The original objective of the work covered in this report was the development of glass enclosed mercury cathode series gaps capable of operating as switches in radar line modulators giving pulses with peak powers of approximately two megawatts. Although satisfactory gaps at this level were produced, the objective was later changed to development of mercury cathode gaps for operation at H. P. S. magnetron levels requiring peak powers of about 10 megawatts. These gaps were required to operate with jitter not exceeding 0.05μs and preferably not exceeding 0.02μs. This objective was also achieved and the gaps are described in this report. The glass enclosed series gaps developed in this investigation have sintered iron sponge mercury cathodes and molybdenum anodes and are satisfactory for operation in S.C.I., A.E.W., and H.P.S. line modulator circuit. Cooling sockets are also described. This report reviews the problems encountered in the development of gaps for the different requirements of this assignment and gives technical data on the operation and fabrication of the gaps. Colorimetric studies of these devices are described. PB 19641 and PB 19642 are earlier reports on this project. This report includes photographs, graphs, diagrams and dimensional drawings.

PB 15285. KATZ, S. Microwave test signals. (MIT Radiation Lab Rept 1023). Jan 1946. 13 p. Price: Microfilm-50¢ - Photostat-$1.00
This report describes an investigation of different types of microwave test signals to establish which test signal can be used with the greatest reproducibility from observer and the greatest consistency for one observer. The effect of some radar parameters, such as r-f pulse width for example, are also investigated. Diagrams and graphs are included.

PB 18852. KURSHAN, J. and ROSSI, B. Analysis of the 6SA7 gated amplifier. (NDRC Rept 14:158) Jul 1943. 19 p. Price: Microfilm-50¢ - Photostat-$2.00
This report describes the operation of a gated amplifier which makes use of a pentagrid converter tube (6SA7). The video signal is applied to grid No. 1, while the gate pulse is applied to grid No 3. The pulses at the plate of the converter tube are rectified by means of a diode and provides an approximately steady potential which is proportional to the area of the video signal overlapped by the gate. There are graphs and a diagram.

PB 18292. MARGENAU, H. Theoretical interpretation of recovery times of TR boxes. (MIT Radiation Lab Rept 929). Jan 1946. 13 p. Price: Microfilm-50¢ - Photostat-$1.00
The experimental data contained in Report 895 are analyzed and interpreted. Recovery is shown to be almost wholly due to capture of electrons by impurity molecules, and the curves presented permit the calculation of attachment probabilities. The initial number of electrons in the TR is estimated to be 10^{14} to 10^{15} per cc. Evidence for dissociation of the capter molecules by the discharge of their recombination during recovery is found in the case of oxygen. For the purpose of the interpretation a simple theory of capture is developed in this report. A graph is included.

PB 16197. MASSACHUSETTS INSTITUTE OF TECHNOLOGY. RADIATION LABORATORY. Handbook of instructions for radio set AN/APS-15 (E2X). (Rept 135-C) Sep 1943. 652 p. Price: Microfilm-$7.00 - Photostat-$44.00
The model AN/APS-15 radar equipment is designed to be used aboard B-17F (Flying Fortress II), or similar aircraft, primarily for locating military objectives on land, and to furnish information for the proper timing of the release of bombs at high altitudes. In addition, beacon reception is provided for navigation and for finding the home base. Frequency for normal and high altitude search and for high altitude bombing is 9375 ± 30 mc; frequency for normal and high altitude beacon is 9355 mc. This detailed instruction book has the following sections: I. General description; II. Installation and adjustment; III. Operation; IV. Mechanical and electrical characteristics; V. Maintenance; VI. Test equipment; VII. Supplementary data and parts list; and VIII. Diagrams. There is a glossary of terms and the illustrations include photographs, line drawings, schematic and wiring diagrams.

PB 16208. MASSACHUSETTS INSTITUTE OF TECHNOLOGY. RADIATION LABORATORY. Instruction manual for experimental service modulator, model 4, type 1372. (Rept M-111) Jul 1942. 36 p. Price: Microfilm-50¢ - Photostat-$3.00
Experimental service modulator, model 4, type 1372 consists of a modulator proper and a 27,000 volt, 100 milliampere, D. C. rectifier for plate supply of the output tubes. The rectifier is covered in the General Electric Company Instruction Book GEI-16067. This manual is concerned with the modulator proper. This is a vacuum tube generator of high power negative pulses of approximately 25 KV and 30-45 amperes. Pulses are of 1 microsecond duration. The modulator is self-triggered to give a recurrence frequency in the range of 850 to 1100 cps governed by a grid bias adjustment on one of the tubes. (Modulator may also be externally triggered.) An analysis of operation is given as well as operation and maintenance instructions. This book includes a manufacturers parts list, labeled photographs, and schematic drawings.

PB 20255. MAURER, R. J. and LASOF, S. A memorandum upon the scattering of light by DT screens. (NDRC Rept 14:198) Nov 1943. 13 p. Price: Microfilm-50¢ - Photostat-$1.00
Measurements have been made of the transmission of a number of virgin DT screens, or screens which have not been subjected to cathode ray bombardment. It was found that the transmission is a minimum in the neighborhood of 5000 Angstroms and increases again in the violet. This behavior can be interpreted in terms of the size of the scattering particles so that the measurements not only shed some light upon the mechanism of the scattering but can be used for the determination of particle size in DT screens. A table and curves interpret the test data. This work was done at Carnegie Institute of Technology.

PB 20251. MAURER, R. J. and LASOF, S. Experiments with double layer DT screens. (NDRC Rept 14:253) May 1944. 24 p. Price: Microfilm-50¢ - Photostat-$2.00
The purpose of these experiments was the determination of the thickness of the darkened layer produced by cathode ray bombardment in evaporated potassium chloride screens. The experiments were performed upon double screens consisting of an underlying layer of sodium chloride with a thin layer of potassium chloride upon it. The beam of primary electrons experiences considerable straggling as it penetrates the potassium chloride, according to the investigators. The result is that the primary current density is a maximum at the vacuum-salt interface and decreases with increasing depth of penetration. The density of secondary electrons also decreases with increasing distance from the vacuum-salt interface. Graphs interpreting the data are included. The experiments were performed at Carnegie Institute of Technology.

PB 20255. MAURER, R. J. and LASOF, S. Memorandum upon the behavior of DT screens containing magnesium. (NDRC Rept 14:214). Dec 1943. 22 p. Price: Microfilm-50¢ - Photostat-$2.00
The purpose of this investigation was the examination of the absorption as a function of wavelength in screens containing magnesium chloride after bombardment in the dark with a cathode ray beam and after partial bleaching with light. The apparatus and experimental procedure are described. It was found that upon bombardment in the dark of a magnesium doped screen only the F band and the M band appear, as in pure KCl screens. When the F band is bleached with light, the R bands of the pure KCl screen, do not develop. Prolonged bombardment with large current densities seems to favor the development, during bleaching of the F band, of a new absorption band which is on the short wavelength side of the F band. Curves, a diagram, and a bibliography are included. The work was performed at Carnegie Institute of Technology.

PB 20250. MAURER, R. J. and LASOF, S. The properties of evaporated layers of potassium chloride containing small additions of metallic elements when subjected to electron bombardment. (NDRC Rept 14:326) Nov 1944. 23 p. Price: Microfilm-50¢ - Photostat-$2.00
This report describes exploratory work upon the behavior of postassium chloride screens containing small amounts of metallic impurities. It was known that small amounts of metallic impurities could profoundly alter the characteristics of DT screens. There was considerable emphasis upon the need for a stable screen whose decay characteristics were faster than those obtainable with pure KCl. Screens containing small percentages of strontium, silver, magnesium, magnesium and silver, manganese, zinc, and sodium were tested. Of the six, the most hopeful and interesting was strontium. In all cases, except the strontium, the initial characteristics of the tube changed irreversibly after electron bombardment and cleanup of the trace. Results of the experiments are given in tables. Work was done at Carnegie Institute of Technology.

PB 17454. MEMOVOX, INC., BEVERLY HILLS, CALIF. Model PE-1 voice recording equipment. (I.C. Instruction Book 534) Mar 1943. 80 p. Price: Microfilm-$1.00 - Photostat-$6.00
The equipment described in this instruction book consists of a cabinet, power control unit, signal input panel, two transcriber-reproducer units, and a desk microphone. Each of the transcriber-reproducer units will record for approximately one hour on a single disc and a clock control automatically shifts the recording operation from one recorder to the other. Recording is done by the constant linear speed system which so rotates the record that the surface speed at any point on the radius is a fixed number of inches per second. The groove is made by the embossing process, rather than by engraving. Reproduction of a recorded disc is accomplished by means of a reproducer head. Parts lists, photographs, vacuum tube data and drawings are included. The equipment was manufactured for the Navy Department, Bureau of Ships.

PB 18095. PANORAMIC RADIO CORP., NEW YORK, N. Y. Preliminary instruction book for panoramic radio adaptor Navy model RBJ. n.d. 83 p. Price: Microfilm-$1.00 Photostat-$6.00
Subject adaptor consists of two identical major units contained in the same enclosure, either of which units may be used in conjunction with an AN/APR-1 receiving equipment, while the other is operated with an AN/APR-5A receiving equipment. Upon connecting the adaptor to the receiver, the operator can see on the screen of a cathode-ray tube all stations receivable within a 10 megacycle band. The station to which the receiver is tuned will appear as a deflection at the center of the screen while all other receivable signals separated by 5 megacycles or less on either side of the frequency of the station tuned in, will be visible as deflections of various heights. This book contains sections on theory of operation, installation and initial adjustments, operation, operator's maintenance, corrective maintenance, parts list and circuit diagram. Photographs and drawings are also included.

PB 17411. RADIO CORPORATION OF AMERICA MANUFACTURING COMPANY, INC. Model DF-7 radio direction finder equipment. Frequency range: 100-1500 KC, alternating current operation. Instructions. (Instruction Book 23988) Jun 1937. 60 p. Price: Microfilm-$1.00 - Photostat-$4.00

These instructions cover the installation, operation, and servicing of the DP-7 radio direction finder. The receiver is of the superheterodyne type and covers the frequency range of 100 to 1500 kc. The equipment will accurately indicate the direction of propagation of pure or modulated continuous wave signals, either keyed or unkeyed, at any frequency within this band. Components and operation of models DP-8 and DQ-2 (for installation on submarines) are also given. The DP-7 and DP-8 are for shipboard installation. Photographs and diagrams are included. The equipment was manufactured for the Navy Department, Bureau of Engineering.

PB 17410. RADIO CORPORATION OF AMERICA MANUFACTURING COMPANY, INC. Model DP-8 radio direction finder equipment, frequency range: 100-1500 kc, alternating current operation. Instructions. (Instruction Book 23989) Jan 1937. 67 p. Price: Microfilm-$1.00 - Photostat-$5.00

These instructions cover the shipboard installation, operation, and servicing of the DP-8 equipment. The receiver is of the superheterodyne type and covers the frequency range of 100 to 1500 kc. The equipment is used to indicate the direction of propagation of pure or modulated continuous wave signals, either keyed or unkeyed, at any frequency within this band. Photographs and diagrams are included. This equipment was manufactured for the Bureau of Engineering, Navy Department.

PB 17409. RADIO CORPORATION OF AMERICA MANUFACTURING COMPANY, INC. Model DP-9 radio direction finder equipment, frequency range: 100-1500 kc, alternating current operation. Instructions. (Instruction book 38032) May 1939. 89 p. Price: Microfilm-$1.00 - Photostat-$5.00

These instructions cover the installation, operation, and servicing of the direction finder equipment specified above. The receiver is of the superheterodyne type. When properly installed and calibrated, the equipment will accurately indicate the direction of propagation of pure or modulated continuous wave signals, either keyed or unkeyed, at any frequency within this band. The receiver for this equipment differs from previous instruments by the addition of an antenna input protective relay and neon protective device. Photographs and diagrams are included. The equipment was manufactured for the Navy Department, Bureau of Engineering.

PB 17408. RADIO CORPORATION OF AMERICA MANUFACTURING COMPANY, INC. Model DP-10 radio direction finder equipment; frequency range: 100-1500 kc; alternating current operation. Instructions. (Instruction Book 38061) May 1939. 77 p. Price: Microfilm-$1.00 - Photostat-$5.00

These instructions cover the shipboard installation, operation and servicing of the DP-10 equipment. The receiver is of the superheterodyne type and covers the frequency range of 100 to 1500 kc. It will accurately indicate the direction of propagation of pure or modulated continuous wave signals, either keyed or unkeyed, at any frequency within this band. The receiver differs from earlier equipment by the addition of an antenna input protective relay and neon protective device. Other minor mechanical features have been improved. A 9-foot flexible loop antenna is supplied. Photographs and diagrams are included. The equipment was manufactured for the Navy Department, Bureau of Engineering.

PB 17769. RADIO CORPORATION OF AMERICA MANUFACTURING COMPANY, INC. Model DQ radio direction finder equipment; alternating current operation; (submarine installation); Instructions. (Instruction book 23909) Oct 1934. 72 p. Price: Microfilm-$1.00 - Photostat-$5.00

These instructions cover the installation, operation, and servicing of the model DQ direction finder equipment for submarine installations. The equipment is of the 115 volt, a-c, 60 cycle, single phase line operated superheterodyne type and covers the frequency range of 100 to 1500 kc. It indicates the direction of propagation of pure or modulated continuous wave signals (either keyed or unkeyed) at any frequency in this band. Photographs, diagrams, parts lists, and schematics are included. This equipment was manufactured for the Bureau of Engineering, Navy Department.

PB 17768. RADIO CORPORATION OF AMERICA MANUFACTURING COMPANY, INCORPORATED. Model DQ-1 radio direction finder equipment; alternating current operation; Instructions. (Instruction Book 23985) Dec 1935. 53 p. Price: Microfilm-$1.00 - Photostat-$4.00

This equipment is designed for installation on submarines and the instructions cover its installation, operation and servicing. It is designed to operate from 110 volt, 60 cycle, single phase service. The receiver is of the superheterodyne type and covers the frequency range of 100 to 1500 kc. When properly installed and calibrated the equipment will accurately indicate the direction of propagation of pure or modulated continuous wave signals, either keyed or unkeyed, at any frequency within this band. The text contains photographs and tables. Diagrams, outlines, schematic diagrams, and graphs are attached. The equipment was manufactured for the Navy Department, Bureau of Engineering.

PB 17762. RADIO CORPORATION OF AMERICA MANUFACTURING COMPANY, INCORPORATED. Models DP-5 & DP-6 radio direction finder equipment, alternating current operation. (Instruction Book 23983) Dec 1935. 67 p. Price: Microfilm-$1.00 - Photostat-$5.00

These instructions cover the installation, operation, and servicing of the direction finder equipment specified, manufactured for the Navy Department, Bureau of Engineering, which is designed to operate from 110 volt, 60 cycle, single phase service. The receiver is of the superheterodyne type and covers the frequency range of 100 to 1500 kc. When properly installed and calibrated the equipment will accurately indicate the direction of propagation of pure or modulated continuous wave signals, either keyed or unkeyed, at any frequency within this band. Tables, graphs, outlines, schematic diagrams, and photographs appear throughout the text or are appended.

PB 17440. RADIO CORPORATION OF AMERICA VICTOR COMPANY, INC. Model DO-1 radio direction finder equipment A.C. - operated - range: 100-1500 KC. Instructions. (Instruction Book 23263) May 1933. 58 p. Price: Microfilm-$1.00 - Photostat-$4.00

These instructions cover the installation, operation, and servicing of the model DO-1 radio direction finder equipment, which is of the 115 volt, a-c, 60 cycle, line operated superheterodyne type covering the frequency range of 100 to 1500 kilocycles, and when installed and calibrated according to instructions will accurately indicate the direction of propagation of pure or modulated continuous wave signals (either keyed or unkeyed) at any frequency in this band. There are photographs and diagrams. The equipment was manufactured for the Navy Department, Bureau of Engineering.

PB 17765. RADIO CORPORATION OF AMERICA VICTOR COMPANY, INC. Model DP-2 radio direction finder equipment; alternating current operation; Instructions. (Instruction Book 23907) Oct 1934. 101 p. Price: Microfilm-$1.50 - Photostat-$7.00

These instructions cover the installation, operation, and servicing of the model DP-2 direction finder equipment, manufactured for the Navy Department, Bureau of Engineering, which is designed for operation from 110 volt, 60 cycle, single phase service. The receiver is of the super-heterodyne type having a frequency range of 100 to 1500 kc, and when properly installed and calibrated will accurately indicate the direction of propagation of pure or modulated continuous wave signals (either keyed or unkeyed) at any frequency in the band. Photographs, diagrams, graphs, tables, and schematic diagram are attached.

PB 17764. RADIO CORPORATION OF AMERICA VICTOR COMPANY, INCORPORATED. Model DP-3 radio direction finder equipment; alternating current operation; (remote operation); Instructions. (Instruction Book 23908) Oct 1934. 101 p. Price: Microfilm-$1.50 - Photostat-$7.00

These instructions cover the installation, operation, and servicing of the model DP-3 direction finder equipment, which is designed for operation from 110 volt, 60 cycle, single

phase service. The receiver is of the super-heterodyne type having a frequency range of 100 to 1500 kc and when properly installed and calibrated will accurately indicate the direction of propagation of pure or modulated continuous wave signals (either keyed or unkeyed) at any frequency in the land. Diagrams and photographs are included. The equipment was manufactured for the Navy Department, Bureau of Engineering.

PB 19241. RAYMOND, HARRY. A graphical method of computing the bending of radio beams by the effective earth radius method: Tentative report. (Camp Evans Signal Lab Tech Rept T-14) Aug 1943. 11 p. Price: Microfilm-50¢ - Photostat-$1.00
Finding the derivative of dielectric constant ϵ with respect to height is the most laborious step in computing the refraction of the radio beam. This report outlines a method of deriving the value of $\frac{d\epsilon}{dh}$ directly from the data without first computing ϵ, and making this computation of $\frac{d\epsilon}{dh}$ by the aid of a simple graph. The method is illustrated by examples.

PB 19242. RAYMOND, HARRY. A study of the effect of the meteorology on the refraction of radio beams. (Camp Evans Signal Lab Tech Rept T-2) May 1943. 13 p. Price: Microfilm-50¢ - Photostat-$1.00
In this study the effect of athospheric refraction on the tracking of planes by radar was found to vary widely from conditions where an initially horizontal beam would be bent downward so much as eventually to strike the ground to cases where the beam would turn upward. Computations based on radiosonde observations show that the variations are mostly at low and moderate elevations and are associated with peculiarities in the vertical distribution of moisture and temperature. Results have not been checked experimentally. Graphs are included.

PB 18067. RCA MANUFACTURING CO., CAMDEN, N. J. Frequency sweep modulator instructions for Type CRV-78091 for use with Model QC (series) echo ranging equipment. (Manufactured by RCA Manufacturing Co., Camden, N. J.). (RCA No. IB-38023) 1939. 11 p. Price: Microfilm-50¢ Photostat-$1.00
This device is an electro-mechanical device designed to be operated with the driver unit of QC Echo Ranging Systems to produce a frequency modulated signal varying above and below the resonant frequency of the projector. This permits better differentiation between local reverberations and the target echo and enables the projector to operate at maximum efficiency. This handbook describes the unit and gives installation, operating, and maintenance information for the equipment. Included are drawings, schematics, labeled photographs and parts lists.

PB 15314. REED, JOHN. Rat race duplexing. (MIT Technology Radiation Lab Rept 885). Feb 1946. 18 p. Price: Microfilm-50¢ - Photostat-$2.00
A method of duplexing using two magic tees and two TR boxes is discussed. This scheme does not require an ATR box. The rat race form of the magic tee is used because of its greater power-handling ability and bandwidth. The high level voltage standing wave ratio is less than 1.13 over the 12 per cent range at X band. The low level loss is less than 1.0 db including TR and ATR loss for all magnetron impedance. S band versions are also described. Sketches, photographs, and curves illustrate the report.

PB 20263. SACK, H. S. and others. Use of a specially designed magnetic amplifier in computing-circuits. (NDRC Rept 14-437). May 1945. 59 p. Price: Microfilm-$1.00 - Photostat-$4.00
Amplifier circuits are described which use specially designed non-linear transformers. These circuits lend themselves to the solution of certain computing problems, such as addition, differentiation, and integration. Tests on different models show that a precision up to .1% and even better can be obtained. Zero fluctuations which determine the long-time stability can be eliminated by an automatic zero adjustment arrangement. These circuits can be of use in computers connected with navigational or range finding radar equipment. Tables, diagrams, and graphs are included. The report was done under contract with Cornell University.

PB 20398. SCHWARTZ, LEONARD S. Effect of a differentiating circuit on a sloping wave front. n.d. 9 p. Price: Microfilm-50¢ - Photostat-$1.00
This paper attempts to show the importance of specifying as steep a wave front as possible for trigger pulses which serve to actuate timing circuits after passage through differentiators. The theory is developed with the use of equations and graphs.

PB 20256. SEITZ, F. Two notes on the potentials developed in cathode ray screens during bombardment. (NDRC Rept 14: 178). Sep 1943. 13 p. Price: Microfilm-50¢ - Photostat-$1.00
This memorandum prepared at Carnegie Institute of Technology is concerned with the calculation of two potentials that are of fundamental interest when cathode ray screens are bombarded. The first is the potential which the bombarded area assumes when the energy of the cathode ray is above the sticking potential and the second is the potential field developed within the layer of the screen penetrated by the primary electron. Nottingham's analysis of the sticking potential is extended to cover the case in which the screen material possesses a finite conductivity. The results show that this analysis should be used when the conductivity is less than 10^{-9} ohm^{-1} cm^{-1}. It is concluded that the KCl screens commonly used satisfy this criterion. The field intensity in the layer of screen material penetrated by the primary electrons is of the order of magnitude of 1000 volts per cm. This appears to be too small to produce an appreciable amount of electrolysis during the times of bombardment that are usually employed in DT tubes. A schematic diagram is included.

PB 19240. SHERMAN, MAX. The calculation of expected vertical coverage diagrams. (Camp Evans Signal Lab Tech Rept T-17) Feb 1943, revised Oct 1943. 15 p. Price: Microfilm-50¢ - Photostat-$1.00
Formulas necessary for the calculation of the electric field for long range radar sets are derived. These enable one to obtain the contours of constant field strength in a vertical plane directly, without first computing the absolute strengths of signals for various heights and ranges. For a satisfactory application of this method the maximum range of the set must be known with a reasonable degree of accuracy. An application of the method to the calculation of coverage diagrams for the SCR-270-271 is included. This paper contains three graphs.

PB 25369. SITTERLY, B. W. Elements of Loran. (NAVSHIPS Rept 900,027) Apr 1944. 48 p. Price: Microfilm-50¢ - Photostat-$4.00
This publication was prepared by the Radiation Laboratory, Mass. Institute of Technology for the Bureau of Ships. It is a general exposition of the principles of the Loran system, written primarily for readers who are not technically trained in electronics. It attempts to explain how Loran works, what its limitations are, and why the system is laid out and operated in the way that it is. Charts, graphs and diagrams illustrate the pamphlet.

PB 17456. SOUNDSCRIBER CORPORATION, NEW HAVEN, CONNECTICUT. Instructions for type CCS-67002 variable speed reproducer unit and type CCS-23345 stepback-brake control unit for installation in model PD voice recording equipments, n. d. 23 p. Price: Microfilm-50¢ - Photostat-$2.00
These instructions cover description, installation, operation, and servicing of the variable speed reproducer unit, type CCS-67002. This unit is intended to replace the type CCS-67006 fixed speed reproducer in Navy model PD transcriber-reproducer equipments carrying serial numbers 1 to 60. Models carrying serial number 61 and above are already so equipped. This unit permits playback of recorded discs at any desired rate between the limits of 33 and 2-3/4 r.p.m.

The unit is also equipped with a turnable brake and back-spacing mechanism. The type CCS-23345 stepback-brake control unit permits operation of the stepback mechanism and turntable brake by foot control. Parts lists, diagrams, and photographs are included. The equipment was manufactured for the Navy Department, Bureau of Ships.

PB 17758. STEPHENSON, H. B. Instructions for echo sounding systems Models NG and NG-1. (Naval Res Lab RA 55A 224) Mar 1934. 27 p. Price: Microfilm-50¢ Photostat-$2.00

The purpose of this apparatus is to measure the depth of water under the keel of a ship. The general principle is to transmit a short vertically directed sound signal into the water, with a transceiver using rochelle salt crystals and to measure the time interval between the transmission of the signal and the return of its echo. The model NG has a circular transceiver while the NG-1 has a rectangular one and one more stage of r-f amplification. The system utilizes high frequency sound of the order of 20 kc. It is possible to measure a wide range of depths with accuracy. The system is designed to flash a lamp from one fathom below the keel to 400 fathoms and to reach depths of 2000 fathoms or more with phones and a suitable timing device. The system is simple to operate and conveniently small. The instructions cover a general discussion of the apparatus, its installation, operation, care and maintenance. Sketches, photographs, and diagrams are attached.

PB 15313. STEINBERGER, W. and CHISHOLM, K. B. K-band linear array. (MIT Tech Radiation Lab Rept 771). Jan 1946. 13 p. Price: Microfilm-50¢ - Photostat-$1.00

Vertically polarized K-band linear array line source for 18° and 29° cylindrical reflectors have been tested. The arrays are center fed and consist of inclined slots designed to match the individual radiators to the line and control the per cent power radiated by each slot. Uniform illumination is obtained by tapering the waveguide in the narrow dimension. The beam, radiated normal to the array, is essentially unchanged over a 1% frequency band. The 17½° linear array has a gain of 25.5 db, side lobes less than 17 db down, and a standing wave ratio which remains less than 1.4 over a 2% frequency band. Diagrams and curves illustrate the text.

PB 17832. SUBMARINE SIGNAL COMPANY, BOSTON, MASS. Installation, operation and maintenance instructions for Model NM-5 echo sounding system. 1935. 113 p. Price: Microfilm-$1.50 - Photostat-$8.00

This is a device for obtaining ocean depths in fathoms manufactured for the Navy Department, Bureau of Engineering for installation on light cruisers, carriers, and destroyers. The sound producer, which serves also as the receiver of the echoes, is a magnetostriction projector which operates at a frequency of approximately 18 kcs. In depths up to 400 fathoms, the operation is automatic. In greater depths, the operator must listen with head telephone receivers or an audible indicator to note the time of return of the echo and read the corresponding depth. The system, as a whole, operates from the ship's 440 volt, 60 cycle, 3 phase power supply. Photographs and diagrams accompany the text of this instruction book.

PB 17828. SUBMARINE SIGNAL COMPANY, BOSTON, MASS. Installation, operation and maintenance instructions for Model QCC echo ranging, Model QCD echo ranging-listening, and Models JK-2B and JK-5 sound listening equipments. 1938. 145 p. Price: Microfilm-$1.50 - Photostat-$10.00

This instruction book covers improvements to the models QC-4 and JK-2A equipments. After modification, the equipments will be designated as model QCC echo ranging equipments, model QCD echo ranging/listening equipments and models JK-2B and JK-5 sound listening equipments. The echo ranging equipment described is a device for obtaining the distance and direction of a visible or invisible object by projecting a signal underwater and noting the time and direction of the return of the echo. It may also be used for telegraphic communication between vessels similarly equipped. The sound producer, which serves also as a receiver of the echoes, is a magnetostrictive projector operating at a nominal frequency of 24 kc. The equipment operates from 230 volts, 60 cycle, single phase current furnished by a D.C. to A.C. motor generator which draws its power from the ships supply line. The frequency of this motor generator supply is controlled accurately by a governor so that a synchronous motor may be used to rotate the disc in the range indicator. The sound listening equipment described is a device for detecting and determining the direction of foreign vessels by listening to their propeller noises. The underwater sound receiver for this system utilizes the piezo-electric properties of Rochelle salts. The equipment operates from the motor generator previously associated with the echo ranging equipment. Tables, outlines, drawings, photographs, diagrams, and a schematic wiring diagram supplement the subject material. The equipment was manufactured for the Navy Department, Bureau of Engineering.

PB 17459. SUBMARINE SIGNAL COMPANY, BOSTON, MASS. Installation, operation, and maintenance instructions for models QCB and QCB-1 echo ranging equipments. 1938. 257 p. Price: Microfilm-$3.00 - Photostat-$18.00

The echo ranging equipments described in this book are devices for obtaining the distance and direction of a visible or invisible vessel, buoy, reef, etc. by measuring the time for an echo to return from a magnetostrictive projector or transceiver operating at a nominal frequency of 24 kc. The equipment may also be used for telegraphic communication. An electrically operated hoisting and rotating mechanism permits the projector to be lowered and trained in any horizontal direction. An appendix contains special instructions for test and alignment of receiver-amplifier. Photographs and diagrams are included. The equipments were manufactured for the Navy Department, Bureau of Engineering.

PB 17806. SUBMARINE SIGNAL COMPANY, BOSTON, MASSACHUSETTS. Installation, operation and maintenance instructions for Models QCE and QCE-1 echo ranging equipments. 1938. 155 p. Price: Microfilm-$2.00 - Photostat-$11.00

This instruction book covers the changes necessary to modify and improve the models QC-5 and QC-5B echo ranging systems. After modification the equipments will be designated as models QCE and QCE-1 respectively. The detailed descriptive material in this book covers only those units of new and improved design furnished as part of the models QCE and QCE-1 equipments. The equipments are used for obtaining distance and direction of visible or invisible vessels, buoys, reefs, etc., using a magnetostrictive projector operating on a nominal frequency of 18 or 24 kc. The book contains installation, operating, and maintenance instructions, parts lists, tabular data, photographs, and diagrams. An appendix contains special instructions for test and alignment of receiver-amplifier, Sub. Sig. spec. 8458. The equipment was manufactured for the Navy Department, Bureau of Engineering.

PB 17869. SUBMARINE SIGNAL COMPANY, BOSTON, MASSACHUSETTS. Installation, operation and maintenance instructions for Models QCM-1 and QCM-2 echo ranging-listening equipments and Models JKA-5 and JKA-5A sound listening equipments. (Spec 8461) Oct 1939. 114 p. Price: Microfilm-$1.50 - Photostat-$8.00

The echo ranging units described in this book are devices for obtaining the distance and direction of a visible or invisible vessel, buoy, reef, etc., by producing a signal in the water and noting the time required the echo to return, and the direction from which it returns. This portion of the equipment may also be used for telegraphic communication between vessels similarly equipped. The sound producer, which also serves as a receiver of the echo, is a magnetostriction projector or transceiver operating at a nominal frequency of 24 kilocycles. The power train unit allows the projector to be trained in any desired direction while the equipment is being used. The book contains sections covering description of the apparatus, principles of operation, installation, operation and maintenance instructions; lists of major parts and spare parts; tabular data on coil, choke and transformer. The Appendix contains special instructions for test and alig-

ment of receiver-amplifier. Tables, photographs and drawings are included. The equipment was manufactured for the Navy Department, Bureau of Ships.

PB 17787. SUBMARINE SIGNAL COMPANY, BOSTON, MASSACHUSETTS. Operation, maintenance and installation instructions for Model MO-2 echo sounding system. 1934. 77 p. Price: Microfilm-$1.00 - Photostat-$6.00
Subject system, manufactured for the Navy Department, Bureau of Engineering, is a device for obtaining ocean depths in fathoms by producing a suitable signal on the vessel equipped with the system and measuring the time elapsing before the return of the echo from the bottom. Subject system combines a depth indicator, amplifier, rectifier power supply and electron tube driver in a single compact unit which may be mounted with the back and/or either side flush against the bulkhead. Report contains list of units comprising subject system, brief description of the apparatus, principles of operation, operating instructions, location of irregularities in operation, installation of model MO 2 high frequency sound system, care and maintenance instructions, lists of major parts and spare parts. Photographs and drawings are included.

PB 17499. SUBMARINE SIGNAL COMPANY, BOSTON, MASSACHUSETTS. Preliminary installation, operation, and maintenance instructions for Models WCA and WCA-1 echo ranging-listening-sounding equipments. (Spec 8479A) Feb 1941. 130 p. Price: Microfilm-$1.50 - Photostat-$9.00
The models WCA and WCA-1 echo ranging-sounding-listening equipments are capable of the following types of operation: (a) QC echo ranging, using the magnetostrictive element of a combination magnetostriction and Rochelle salt projector; (b) JK listening, using the Rochelle salt element of the combination projector; (c) echo sounding, using a magnetostriction sounding projector; (d) QB echo ranging-listening, using a separate Rochelle salt projector; and (e) telegraphic communication with other vessels equipped with similar ranging units. Drawings and diagrams are included. The equipment was manufactured under contract with the Navy Department, Bureau of Ships.

PB 17703. SUBMARINE SIGNAL COMPANY, BOSTON, MASSACHUSETTS. Preliminary instruction book for Navy Model SU radar equipment (Equipments 6-100). n. d. 90 p. Price: Microfilm-$1.00 - Photostat-$6.00
This equipment is used on shipboard to detect the presence of objects and determine their distance and bearing with respect to the ship. Three range scales are provided on the control and range unit, with maximum readings of 8000 yds., 40,000 yds., and 80 mi. The range can be read directly on these three scales. The equipment takes its power from the 115 volt, 60 cycle ship's line. A motor-generator is provided to furnish power for some purposes. The instructions cover description, installation, operation and maintenance of the equipment. Tables, outlines, diagrams and schematic diagrams are included. The report is undated, but the drawings bear dates from September 1943 to March 1944. The equipment was manufactured for the Navy Department, Bureau of Ships.

PB 17497. SUBMARINE SIGNAL COMPANY, BOSTON, MASSACHUSETTS. Preliminary instruction book for Navy Model WEA-2a echo ranging-listening-sounding equipment. (Spec 84107A, Add. A) Mar 1944. 84 p. Price: Microfilm-$1.00 - Photostat-$6.00
The material covered by this instruction book was furnished to provide remote electric training operation for the model WEA-2 echo-ranging-listening-sounding equipment. The modified equipment is designated as model WEA-2a. The remote training control unit, type CBM-23370, permits the operator to train the projector to any desired bearing from a remote position. This unit also provides continuous remote indication of the relative bearing of the underwater sound beam with respect to the ship's bow. Signals from the generator system are applied to the control rectifier and this unit provides current of the proper polarity and voltage to the motor of the hoist-train unit, which causes the projector to follow the setting of the remote control handwheel. Photographs, drawings, and diagrams are included.

PB 18044. SUBMARINE SIGNAL CO., BOSTON, MASS. Preliminary operating instructions for models MM-14 and MM-14A echo sounding equipments. (Sub. Sig. Spec. 8342A) Mar 1940. 38 p. Price: Microfilm-50¢ - Photostat-$3.00
This manual presents instructions for the installation, operation and maintenance of Models MM-14 and MM-14A echo sounding equipments, with tables and schematic wiring diagrams. These equipments for obtaining ocean depths in fathoms utilize a magnetostrictive projector operating at a nominal frequency of approximately 24 kc.

PB 15318. SUEN, T. J. and EVERHART, E. M. Dielectric constants and loss tangents of radome materials. (MIT Technology Radiation Lab Rept 483-25 Radome Bulletin 25). Jan 1946. 36 p. Price: Microfilm-50¢ - Photostat-$3.00
This report consists of tabulated results of X-band measurements of dielectric constants and loss tangents of radome materials. Two appendices are attached giving an empirical general formula for estimating dielectric constant of mixtures and information on dielectric constant of oriented materials. Graphs and a bibliography are included.

PB 6224. TUCKER, JAMES W. Reduction of precipitation and atmospheric static in aircraft radio receivers. 9 May 1945. (AAF. Engineering Division TSEMRZB3-44). 1945. 20 p. Price: Microfilm-50¢ - Photostat-$2.00
A memorandum report on: (1) development of devices to minimize the interfering effects of precipitation and atmospheric static on radio receiving and navigating equipment; and (2) oscillographic study of the nature of the various types of precipitation and atmospheric static encountered in aircraft operation. Discussion of anti-static devices and the R.F. limiter is made. It is believed that a comprehensive knowledge of all of the factors affecting the character of corona discharge under flight conditions is essential for the logical development of anti-static devices and would be of great value in the possible improvement of quiet static discharge devices. Diagrams and photographs, including films of laboratory generated coronas are included.

PB 13620. U. S. NAVY DEPARTMENT. BUREAU OF AERONAUTICS. Test specification for model AN/APA-6A airborne pulse analyser. (NAVAER-ET-104) Oct 1944. 3 p. Price: Microfilm-50¢ - Photostat-$1.00
A very brief procedure is given for testing and calibrating the AN/APA-6A installation in naval aircraft to determine that it is operating satisfactorily. Test equipment required includes one each test oscillator, pulse generator, and motor alternator of designated model and size. Pre-installation calibration and adjustment, and installation tests are included.

PB 20494. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. A handbook of SO-series radar. (NAVSHIPS 900,071-I.B.) n. d. 40 p. Price: Microfilm-50¢ - Photostat-$3.00
This report contains a set of pictorial charts on fault location, maintenance, and routine maintenance timetable for the SO-series radar. It was prepared by the Raytheon Manufacturing Company as a guide for Navy radar operators and technicians to supplement a film on the maintenance of this equipment.

PB 20493. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. Instructional radar diagrams no. 5, SOa/SO-1. (NAVSHIPS 900,056) Dec 1943. 14 p. Price: Microfilm-50¢ - Photostat-$1.00
A set of schematic diagrams of the SO-1 and SO-A radar system comprises this report, prepared by Lt. (jg) A.P. Di Vincenzo of the Pacific Fleet Radar Maintenance School.

PB 20491. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. Instructional radar diagrams no. 6, SL-a/SL-1. (NAVSHIPS 900,082) Apr 1945. 31 p. Price: Microfilm-50¢ Photostat-$3.00

This volume of diagrams is intended primarily to aid technicians in the field in locating faulty components after the defective circuit has been isolated. The material supplements the regular instruction books on the SL-a/SL-1 radar equipments. There are 28 block, schematic, and circuit diagrams.

PB 17496. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. Instruction book for echo ranging/listening equipment, Model WEA-1. (NAVSHIPS 900,507 Instruction Book 38139) Mar 1945. 213 p. Price: Microfilm-$2.50 - Photostat-$15.00
These instructions cover the installation, operation, and maintenance of the model WEA-1 echo ranging/listening equipment with hoist-train mechanism, manual hoist-electric train. The equipment is magnetostrictive in principle and its purpose is to emit supersonic signal pulses and to receive echoes from submerged objects. A third function is to provide a means of listening for supersonic noise or signals. The equipment serves also for underwater communication and for determination of the bearing of any source of noise or signal within the frequency range of the receiver. Field changes in the equipment are outlined, and there are parts lists, commercial bulletins, and instructions for auxiliary motor generator power equipment. The book is illustrated with photographs, drawings and diagrams. The equipment is manufactured by the RCA Victor Division, Radio Corporation of America.

PB 20786. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. Instruction book for Navy model ASE/ASE-1 aircraft radar equipment. (OO-NAVAER 08-5S-62). Apr 1942. 239 p. Price: Microfilm-$2.50 - Photostat-$16.00
Navy model ASE/ASE-1 equipment, manufactured by the Philco Corporation, is installed in aircraft for the purpose of detecting and locating objects on the surface of the sea. The equipment consists of a power supply, transmitter, receiver, and one, or in some cases two, indicator units. Accessory equipment includes antenna arrays, an antenna switching unit and an antenna change-over switch. The normal frequency range of the equipment is from 170 to 180 mc. The handbook covers description, installation, operation, and maintenance instructions, test equipment, tube data, and parts lists. There are numerous photographs, drawings, and diagrams. An appendix contains adjustment and maintenance instructions for the antenna switching unit (Polyplexer), and supplementary maintenance notes.

PB 17734. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. Instruction book for Navy model QHB herald equipment. (NAVSHIPS 900,369-IB) Apr 1945. 221 p. Price: Microfilm-$2.50 - Photostat-$15.00
This equipment is intended for installation at the entrance to harbors and bays to provide a means of searching a sector of the waters for submerged objects, by means of super-sonic (above audibility) sound waves projected into the water, which, when impinging upon any submerged object have a portion of their energy reflected in the manner of an ordinary echo. These sound waves are projected, and in turn received by means of a projector located on the sea bottom. The signal producing, signal receiving and indicating equipment and remote training control is located on shore and is connected to the projector by means of submarine cables. Two range scales are provided, 0 to 1000 yards and 0 to 4000 yards with alternate ranges of 0 to 2000 and 0 to 8000 yards. In addition to locating submerged objects the system may be used as a listening device for noises created by propellers. The equipment is designed to operate from a 115 volts, 60 cycle, single phase source of a-c power and requires approximately 700 watts for its operation. The instructions cover: the equipment, description, installation, operation, and maintenance of the system, illustrated by photographs, drawings, tables and schematic diagram. The equipment is manufactured by RCA Victor Division of the Radio Corporation of America and Wallace and Tiernan Products, Inc., Belleville, N. J.

PB 17971. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. Instruction book for Navy Model RBF-3 sono-radio-buoy receiving equipment for reception of frequency modulated signals (manufactured by Wells-Gardner & Co., Chicago). (NAVSHIPS 900,225 I B). Dec 1942. 161 p. Price: Microfilm-$2.00 - Photostat-$11.00
This equipment consists of a superhetrodyne FM radio receiver covering the 70 to 90 mc range in one band, and a mechanical tuner which can be set to monitor continuously up to 10 different frequencies. Push-button and manual tuning are also provided. This device was designed to monitor sono-radio-buoy transmitting equipments. It operates on a 90-125 volt, 50-60 cycle, single phase AC power supply. Major units are a receiver-tuner assembly, antenna assembly, and constant voltage transformer. Spare parts, tools, and a multimeter are also supplied. The instruction book gives a complete description and instructions for installation, operation, and maintenance of the equipment. Full parts lists, installation and maintenance drawings, labeled photographs, schematics, and wiring diagrams are provided.

PB 17464. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. Instruction book for Navy Models X-TDY and TDY, radio transmitting equipment, and supplement 1. (Navships 900, 307-IB) Oct 1944. 97 p. Price: Microfilm-$1.00 Photostat-$7.00
The models TDY and X-TDY equipments, manufactured by General Electric are designed primarily for shipboard use. The purpose of the transmitter is to radiate a jamming signal of random noise modulated, on a carrier frequency being used by enemy communication or radar systems. Nominal power output is 150 watts; emission is MCW; and frequency range is 175 to 770 mc. The book contains sections on description of major units (radio transmitter Navy type CG-X52ACY or CG-52ACY, antenna, R-F cable, bulkhead switch assembly, and bulkhead transformer), installation, theory of operation, adjustments, emergency operation, typical performance data, and maintenance. There are parts lists, photographs, drawings, and diagrams.

PB 17816. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. Instructions for Navy model SC-4 radar equipment. (NAVSHIPS 900,007-IB) Apr 1944. 47 p. Price: Microfilm-50¢ - Photostat-$4.00
Installation, together with applicable drawings of major units of subject equipment is described in this book. The manufacturer is General Electric Company.

PB 20242. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. Instructions for the operation of SA2-PPI radar. (NAVSHIPS 900041). Jul 1944. 77 p. Price: Microfilm-$1.00 - Photostat-$6.00
The purpose of this pamphlet is to provide assistance in the training of operators of the SA2-PPI radar. Its content has been compiled and arranged by the RCA Service Company, Inc., and consists of pictorial and graphical operation and maintenance suggestions for this aircraft search equipment.

PB 16036. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. Loran transmitting station manual. (NAVSHIPS 900,080A - Text. 900,069B - Drawings (Coast Guard) Mar 1945. 125 p. Price: Microfilm-$1.50 - Photostat-$9.00
The manual gives a general treatment of transmitting equipment and shore station layout of the Loran system of navigation. Basic considerations are first discussed in some detail. Different models of the various components used in this system are then described and differences between them are noted. General installation, operation, and maintenance information is given and a brief reference is made to monitor stations and ship and aircraft installations. Photographs, graphs, tables, and a list of references are included in the manual. Eighteen unbound construction and layout drawings and schematics are also included.

PB 20492. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. Maintenance manual for WCA-2 sonar equipment. (NAVSHIPS 900,414) 1945. 440 p. Price: Microfilm-$4.50 - Photostat-$30.00

Model WCA-2 sonar equipment consists essentially of three individual systems: (1) QC-JK echo ranging and listening unit, characterized by a combination projector which includes a magnetostriction (QC) element and a Rochelle salt (JK) listening element; (2)a QB echo ranging and listening system, having a Rochelle salt projector which provides for echoes over a wider range of frequencies than the QC system; and (3) the "EM" system employing a fixed magnetostriction sounding projector and used solely for sounding. The systems are interdependent, each using one or more units in common with one or both of the other systems. This manual contains general description, installation check lists, operating instructions and detailed maintenance instructions. There are numerous sketches, schematic, block and circuit diagrams.

PB 17714. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. Preliminary instruction book for Model UE-1 timer. (NAVSHIPS 900,427-IB; GEI-19660) Dec 1944. 353 p. Price: Microfilm-$4.00 - Photostat-$24.00
The information contained in this instruction book applies specifically to the model UE-1 Timer although general references are made to the Loran shore system as a whole. The UE-1 Timer is a vital link in this system. It is a unit of a land-based Loran transmitting station and performs the function of developing accurately timed pulses which are fed to the exciter for the transmitter itself. The timer incorporates a highly accurate crystal oscillator which operates a 100 kc sinewave. Ultimately this crystal governs the pulse repetition rate of the associated Loran transmitter. The book contains instructions on installation, adjustment, operation, and maintenance, including photographs, wiring and winding diagrams, curves, drawings, a list of manufacturers, and a parts and spare parts list. The manufacturer is General Electric Company.

PB 18040. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. Preliminary instruction book for Navy model TCS-14 radio telephone and telegraph transmitting and receiving equipment. (Manufactured by Air King Products Co., Inc., Brookly, N. Y.) (Air King Part PIB-101) 1943. 106 p. Price: Microfilm-$1.50 - Photostat-$7.00
The Navy model TCS-14 radio equipment is a complete radio transmitting and receiving installation. It is designed for use in mobile and portable services. The transmitter has an oscillator and a buffer amplifier with provisions for the emission of either CW or voice modulated signals. The frequency range is 1500 to 12,000 kc. The power output is 20 watts on voice and 40 watts on CW at all radio frequencies within its range. The receiver employs a sensitive superheterodyne circuit, which will deliver 6 milliwatts audio power with less than 15 microvolts input throughout its frequency range (1500 kc to 12,000 kc). The manual contains sections on circuit description, installation in adjustment and operation, maintenance and service as well as information on power requirements. Supplementary photographs, schematic and wiring connection diagrams are also included.

PB 17713. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. Preliminary instruction book for Navy model UK Loran switching equipment. (NAVSHIPS 900, 377 IB) Oct 1944. 56 p. Price: Microfilm-$1.00 - Photostat-$4.00
These instructions cover the installation, operation, and servicing of this equipment. The Loran system of navigation requires synchronized transmission from a pair of land stations. One is termed the "master" or "A" station; the other the "slave" or "B" station. The primary purpose of the switching equipment is to isolate the input of the timer receiver from the powerful local transmitter signal; to provide means of entrance and exit of power, antenna and control circuit cables to the shielded room; and to provide a convenient means of switching certain associated equipment into operation as occasion requires. Power supply - 115 volts, 60 cycles, single phase, 45 watts. Tables, photographs, diagrams and schematic diagram are attached to the instructions. The manufacturer is Sylvania Electric Products, Inc.

PB 17712. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. Synchronizer modifications kit. (Modification Kit No. 1 for model UJ timing equipment). (NAVSHIPS 900,375-1-IB) Aug 1944. 14 p. Price: Microfilm-50¢ - Photostat-$1.00
The synchronizer unit of the model UJ timing equipment corrects the frequency of the timer oscillator to keep the local pulse and the distant received pulse matched in time relationship for Loran transmitting stations. This kit makes the synchronizer unit usable at double-pulsed stations. As originally supplied, it will operate properly only at single-pulsed stations. The modification consists of the addition of a type 6SN7 vacuum tube V-20 and a potentiometer R-64, in the synchronizer unit. There are drawings and diagrams. This report forms an addendum to NAVSHIPS 900,375-1B: "Preliminary instruction book for model UJ timing equipment".

PB 20490. U. S. NAVY DEPARTMENT. BUREAU OF SHIPS. The amplidyne: how it works. (NAVSHIPS 900,079) Jan 1945. 9 p. Price: Microfilm-50¢ - Photostat-$1.00
This pamphlet was prepared primarily for the use of submarine personnel, giving the basic principles of the amplidyne generator. This is an electro-mechanical device which will amplify a small control signal into sufficient power to control a large motor. Among its uses are the rotation of radar antennas or sonar equipment. Diagrams and sketches illustrate the book.

PB 21907. U. S. WAR DEPARTMENT. Aided-azimuth-tracking kit No. A96-P1. (Tech Manual 11-1057). Sep 1943. 21 p. Price: Microfilm-50¢ - Photostat-$2.00
This kit consists of an attachment and a set of parts for installation on control unit BC-36-A of radio set SCR-296. The purpose of the kit is to obtain aided tracking by combining the direct-tracking and rate-tracking functions of the radio set. The manual describes installation, operation, functioning of parts, and maintenance. Photographs, wiring and schematic diagrams are included.

PB 21896. U. S. WAR DEPARTMENT. Antenna kit for double-doublet receiving antenna; Drawing RS-B-276-F. (Tech Manual 11-2629). Nov 1944. 29 p. Price: Microfilm-50¢ - Photostat-$2.00
This manual covers the construction of a double-doublet receiving antenna, which may be closed as a general purpose antenna for use in installations where the highly directional characteristics and gain of the rhombic are not required. The antenna length is intended for operation on frequencies from 2.5 to 20 mc. Installation drawings and diagrams are included.

PB 21910. U. S. WAR DEPARTMENT. Calibrator BC-725-A. (Tech Manual 11-1048). Nov 1942. 60 p. Price: Microfilm-$1.00 - Photostat-$4.00
Range unit BC-723-A of radar set SCR-296-A is essentially a 360-degree phase shifter indicating its angular position in yards range. This calibrator provides a means for checking and calibrating the range unit, i.e., determining the amount by which the actual range (as fixed by the actual phase shift) may deviate from the indicated range. A cathode-ray oscilloscope is required for use with the calibrator. The calibrator is in four circuit sections: an oscillator circuit, two harmonic producer or multiplier circuits, and a power-supply circuit. The manual, which was prepared by Western Electric Company, Inc., contains illustrative photographs and diagrams.

PB 21898. U. S. WAR DEPARTMENT. Instruction book for antenna equipment RC-173. (Tentative Tech Manual 11-2618). Sep 1943. 21 p. Price: Microfilm-50¢ - Photostat-$2.00
Antenna equipment RC-173, manufactured by L. S. Brach Manufacturing Corporation, Newark, N. J., is an ultra-high-frequency and low frequency antenna system which provides either directional or non-directional ultra-high-frequency antennas for use with several radio receivers simultaneously. It consists of an insulated 30-foot, 3-section, tubular steel mast and three tiers of dipole assemblies, two in each tier at

right angles to each other. Each dipole assembly covers a specific frequency band within the ranges of 27-145 mc. The mast is used as an antenna for low frequencies. This manual describes erection and maintenance and contains a parts list and drawings.

PB 21906. U. S. WAR DEPARTMENT. Radio transmitter BC-677 and associated equipment kit No. 68-K2. (Tech Manual 11-1060). Sep 1943. 79 p. Price: Microfilm-$1.00 - Photostat-$6.00
The BC-677 transmitter and associated equipment is intended to replace earlier-type transmitters and keying units in radar sets of the SCR-268 series now in service. It has fewer tubes, is easier to adjust, and requires fewer spare parts. The equipment is used for detecting and locating aircraft by means of ultra-high frequency radio waves. The transmitter is capable of being tuned over a range of from 200 to 215 mc and oscillates only when the grid bias is removed from its tubes by a pulse from the keying unit. The scope of this manual is limited to a treatment of the replacement components and their relation to the elements of the SCR-268 set. Photographs and diagrams illustrate the work.

PB 21909. U. S. WAR DEPARTMENT. Range calibrator I-178 and I-178-A. (Tech Manual 11-1051). Jan 1944. 51 p. Price: Microfilm-$1.00 - Photostat-$4.00
The subject calibrators are designed for calibrating range units BC-436-A and BC-436-B. The calibrators provide a method of calibrating the range unit by the comparison of two different range indications, the range shown on an indicator mechanically coupled to the range unit and a range standard defined by electrical relationships on the screen of an oscilloscope. The calibrator consists of a pulse circuit and a multiplier circuit with separate inputs but with a common output. (The range unit is used in connection with radar sets SCR-268-A or B). The illustrations include photographs, diagrams, and auxiliary range dials.

PB 21948. U. S. WAR DEPARTMENT. SIGNAL CORPS. Antenna system AS-81/GR. (Tech Manual 11-2608). May 1944. 49 p. Price: Microfilm-50¢ - Photostat-$4.00
This is a one-tube directional antenna system designed as an addition to communication receivers to permit the operator to make use of unidirectional reception for purposes of anti-jamming. By the use of 4 loops, this system can cover a frequency range of 1.1 to 16 megacycles. The description of the system and its components is followed by instructions for the installation, operation and maintenance of the equipment with different radio sets. Photographs, diagrams, charts, tables and a parts list are included.

PB 20787. U. S. WAR DEPARTMENT, U. S. NAVY DEPARTMENT and AIR COUNCIL OF THE UNITED KINGDOM. Handbook of maintenance instructions for model AN/APS-3A aircraft radar equipment. (CO-AN-08-30APS3-3-X) May 1945. 337 p. Price: Microfilm-$3.50 - Photostat-$23.00
This maintenance manual supplies installation, operation, theory of operation and maintenance information for model AN/APS-3A aircraft radar equipment. The equipment is designed to locate land masses and objects on the surface of the ocean, the position of other aircraft, and the whereabouts of the base to which the pilot must return. Transmitting frequency for all operations and receiving frequency for search operation is 9375 mc; receiving frequency for beacon operation is 9310 mc. Included in the manual are a table of replaceable parts, photographs, and diagrams.

PB 20784. U. S. WAR DEPARTMENT, U. S. NAVY DEPARTMENT and AIR COUNCIL OF THE UNITED KINGDOM. Handbook of maintenance instructions for model AN/APS-15 aircraft radar equipment. (CO-AN-08-30APS15-2) Feb 1944. 483 p. Price: Microfilm-$5.00 - Photostat-$31.00
The AN/APS-15 equipment is designed for use in aircraft, to aid primarily in the location and identification of objects on land and sea, in the bombing of targets, and in homing and precision navigation. The equipment has a transmitting frequency for all operations of 9375 ±40 mc, a receiving frequency for search and bombing operations of 9375 ±40 mc, and for beacon operation of 9310 ±3 mc. The peak RF power output is 30-40 kw. The handbook contains sections on general description, installation and adjustment, operation, mechanical and electrical characteristics, maintenance, supplementary data, and table of replaceable parts. Many photographs, drawings, and diagrams are included.

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PB 21177. U. S. WAR DEPARTMENT, U. S. NAVY DEPARTMENT and AIR COUNCIL OF THE UNITED KINGDOM. Handbook of maintenance instructions for models AN/APS-2F and AN/APS-2G aircraft radar equipment. (CO-AN-08-30APS2-2) Oct 1944; rev. Apr 1945. 611 p. Price: Microfilm-$6.50 - Photostat-$41.00
These radar equipments are designed for use in aircraft to aid in the location and identification of objects on land and sea, and as an aid in navigation during day or night and in all kinds of weather. The equipment operates on a fundamental frequency range of 3300 mc ±1%, when used for search operation, and 3256 mc for beacon reception. It operates from a power source in the aircraft. The signal beam will cover all distances up to 100 nautical miles in steps of four ranges, and peak r-f power output is 50 kw. During search the equipment may or may not use azimuth stabilization. The handbook contains sections on general description, installation and adjustment, operation, theory of operation, maintenance, supplementary data, tables of replaceable parts, and drawings. The illustrations include photographs, charts, and diagrams.

PB 21176. U. S. WAR DEPARTMENT, U. S. NAVY DEPARTMENT and AIR COUNCIL OF THE UNITED KINGDOM. Handbook of maintenance instructions for models AN/APS-15A and AN/APS-15B, aircraft radar equipment. (CO-AN 08-30APS15-3)
Jul 1944, rev Nov 1944 and Aug 1945. 531 p. Price: Microfilm-$5.50 - Photostat-$36.00
The four general functions of the equipment are: Searching, precision ranging, bombing, and navigation. All controls for the operation of the equipment are located on four separate units: The receiver-indicator, the control unit, the computer, and the plan repeater indicator. The transmitting frequency for all operations is 9375 ±40 mc per second; receiving frequency for search and bombing operation is 9375 ±40 mc; and receiving frequency for beacon operation is 9310 ±10 mc. This handbook has sections on general description, installation and adjustment, operation, theory of operation, maintenance, supplementary data, table of replaceable parts, and drawings. The illustrations include photographs, drawings, block, wiring, and schematic diagrams. (Four pages are missing from Section I of this copy.)

16-30APS2-11

PB 20785. U. S. WAR DEPARTMENT, U. S. NAVY DEPARTMENT and AIR COUNCIL OF THE UNITED KINGDOM. Handbook of maintenance instructions for models of the AN/APS-2 series equipment. (CO-AN-08-30APS2-1) Nov 1945. 494 p. Price: Microfilm-$5.00 - Photostat-$33.00
The purpose of these aircraft radar equipments is to locate objects, such as surface vessels on the sea and aircraft in the air and to indicate to the pilot and operator the relative direction and distance between the aircraft and object detected. Beacon reception is also provided. This detection is accomplished through the use of ultra-high frequency waves and portrayed visually through the use of cathode ray tube indicators. The fundamental difference between the models of the AN/APS-2 series is in the type of mounting bases for different types of aircraft. This handbook contains sections on general description, installation, operation, mechanical and electrical characteristics, maintenance, special test equipment, supplementary data, table of replaceable parts, and list of manufactures. Photographs, drawings, and diagrams are included.

PB 20802. U. S. WAR DEPARTMENT, U. S. NAVY DEPARTMENT and AIR COUNCIL OF THE UNITED KINGDOM. Handbook of maintenance instructions for Navy model AIA aircraft radar equipment; revised edition. (CO-NAVAER 08-5S-17)
Sep 1944. 386 p. Price: Microfilm-$4.00 - Photostat-$26.00

The model AIA radar equipment is designed for installation in aircraft. Its purpose is to furnish the pilot with information as to the position of enemy aircraft with respect to his own plane during night operations or other periods of poor visibility. The pilot uses this information to fly his plane to the proper point for opening fire on the target. The transmitter operates on a frequency of 9375 mc. Handbook contains sections on description, installation, operation, electrical circuit description, and maintenance. Also included are a glossary of terms, list of replaceable parts, photographs, drawings, schematic and circuit diagrams. The major changes in the equipment since publishing of the original handbook in Nov 1943 and the issuing of this revised edition are outlined. For operating and maintenance instructions for AIA test equipment, see PB 20803.

PB 20806. U. S. WAR DEPARTMENT, U. S. NAVY DEPARTMENT and AIR COUNCIL OF THE UNITED KINGDOM. Handbook of maintenance instructions for Navy model ASD aircraft radar equipment; revised edition. (CO-NAVAER 08-5S-2) May 1944. 368 p. Price: Microfilm-$4.00 - Photostat-$25.00
The model ASD aircraft radar equipment is designed for mounting in aircraft and is used for detection of enemy vessels on the surface of the ocean. The set is also used for receiving beacon signals. The transmitted signal is 9375 mc. The handbook has sections on description, installation, adjustments, operation, electrical circuit description, maintenance, and replaceable parts list. Photographs, drawings and diagrams are included. For description and use of ASD test equipment, see PB 20803.

PB 21175. U. S. WAR DEPARTMENT, U. S. NAVY DEPARTMENT and AIR COUNCIL OF THE UNITED KINGDOM. Handbook of operating instructions for models AN/APS-15A and AN/APS-15B aircraft radar equipment. (AN 08-30APS15-3) Jul 1944, rev Oct 1944 and Mar 1945. 104 p. Price: Microfilm-$1.50 - Photostat-$7.00
This manual supplies information for the installation, operation and emergency repair of this aircraft radar equipment. Complete operating and maintenance instructions are not included in the handbook. Photographs, drawings and diagrams are provided.

PB 20799. U. S. WAR DEPARTMENT, U. S. NAVY DEPARTMENT and AIR COUNCIL OF THE UNITED KINGDOM. Handbook of operating instructions for model AN/APS-17 (XN-1) aircraft radar equipment. (NAVAER 08-5S-141) Jun 1944. 17 p. Price: Microfilm-50¢ - Photostat-$2.00
This handbook describes the location and function of controls, the construction details of cables, and dimensions and weights of plugs and cables in connection with operating instructions for this aircraft radar equipment. Drawings of the cable and plug assembly and a photograph of the control box for the equipment are included.

PB 18357. UNIVERSITY OF CALIFORNIA. DEPARTMENT OF ELECTRICAL ENGINEERING. Mechanical vacuum switches, transmission line and R. C. Pulsing circuits. (Final report of the work done under contract OEMsr-652 between the University of California and OSRD) (NDRC Rept 14: 156) Jun 1943. 24 p. Price: Microfilm-50¢ - Photostat-$2.00
The object of this investigation was to design a switch which could produce high voltage pulses at a rate of from 200 to 500 cps for possible use in radar equipment. These three types of vacuum switches were investigated and did not meet requirements: polarized, tuned fork, and tuned polarized vacuum switches. Experiments with the open-ended, potential reversing transmission line system of pulse production were promising but could not be completed because some circuit components were not available. Thyratron switches in an RC circuit were also tried with encouraging results. This report summarizes experimental work performed. Drawings, graphs, oscillograms and schematics are included.

PB 17760. WALLACE AND TIERNAN PRODUCTS, INC., BELLEVILLE, N. J. Instruction book for Navy Model NAA underwater sound beacon. Jan 1944. 44 p. Price: Microfilm-50¢ - Photostat-$3.00
These instructions cover the handling, testing and operation of this equipment, (Navy type CWT-52333) for automatically transmitting programmed, non-directional, supersonic signals over a period of from ten to twelve hours following a predetermined starting time; within forty eight hours after which sea valves are opened electrically to sink the apparatus and thus end its useful life. Five identical navy model NAA Beacons are used. Each beacon contains electrical and mechanical apparatus to deliver a definite signal (A, B, N, R or V) of programmed, definite frequency (17, 19, 21, 23 or 25 kc), supersonic energy to its projector. Parts lists, photographs, general assembly and schematic diagrams are included.

PB 17756. WESTERN ELECTRIC COMPANY. Instruction book for Navy Model CAU practice target equipment. n. d. 72 p. Price: Microfilm-$1.00 - Photostat-$5.00
This equipment manufactured for the Bureau of Ships, Navy Department is intended to be used as a substitute for a stationary submarine in the training of Naval personnel in the art of Sonar echo ranging operation. It is essentially a free buoy containing batteries, an amplifier and control equipment with a projector support suspended beneath it. The underwater sound beam is picked up by the receiving projector, amplified and transmitted to the water from the transmitting projector as though it had been reflected from a stationary submarine. Installation, operation and maintenance as well as a description of the equipment are covered. Parts lists, photographs, block, schematic and wiring diagrams and outline drawings are included.

PB 18062. WESTERN ELECTRIC COMPANY, INC. Temporary instructions for model SE radar equipment. Apr 1942. 40 p. Price: Microfilm-50¢ - Photostat-$3.00
The SE radar equipment was manufactured for the Navy Department, Bureau of Ships, for use on small surface craft for detection of ships, submarines on the surface, or land marks. The nominal signal frequency is 3000 mc. The main components are a power control unit, a motor-generator set, a transmitter-receiver, an antenna assembly, a train indicator, a range indicator, and an adapter control unit. This handbook contains installation and operation instructions and schematic and wiring diagrams.

PB 17456. WESTINGHOUSE ELECTRIC AND MANUFACTURING COMPANY. Navy model PB facsimile equipment. (Instruction Book 5645) Jun 1930. 82 p. Price: Microfilm-$1.00 - Photostat-$6.00
The purpose of the Navy model PB facsimile equipment is to transmit pictures, typewriting, and free hand sketches, over wire or radio from one point to another, the received picture being an exact duplicate of the original. The maximum size of sketches that can be sent is 5 by 6 inches. The received picture is made by an electrolytic process which instantaneously records visibly and indelibly a facsimile of the original. This equipment may be used with any type of tube transmitter which will follow very rapid keying. The time required to send a complete picture is four minutes. Any receiver capable of receiving CW signals may be used for reception. This book contains sections on description, installation, operation, maintenance, vacuum tubes, and parts lists. There are photographs and diagrams.

PB 19238. WOODYARD, ORVILLE, C. Design of a lightweight antenna for the AN/TRC-8. (Camp Evans Signal Lab Tech Memo 1GE) Apr 1945. 14 p. Price: Microfilm-50¢ - Photostat-$1.00
This report describes a lightweight high gain antenna for use with a communications relay station. The gain is approximately 11.5 db over a dipole in free space and the bandwidth (in azimuth) is about 27 degrees at half power. It gives good performance over a wider range than its operating band of 230-250 mc. with a standing wave ratio on the feed line of less than 2 to 1 in voltage. The report includes performance graphs, photographs and a detail drawing.

FOOD AND KINDRED PRODUCTS

PB 19262. BALLIS, A. K. Yeast production from wood sugars by the Bergius process. (FIAT Final Rept 493) Jan 1946. 6 p. Price: Microfilm-50¢ - Photostat-$1.00
The product of the plant, Süddeutsche Holzversuckerungswerke at Regensburg, was a dry yeast in the form of light yellow flakes, with about 50% protein, used for horse feed. The process used small pieces of wood, usually fir, digested in 5% HCl for 36 hours, washed for an equal length of time, then concentrated until it was 60% sugar and 5% HCl, neutralized with lime, charged with nutrient salts and served as a culture for Torula utilis for a 12 hour fermentation period. The mash was dried by conventional drum dryers. 1400 tons of wood produced 500 tons dried yeast and 500 tons dried lignin briquettes. Excessive quantities of power and chemicals were required. The process was not economical and its wartime operation may have been approved on the grounds of convertability to phosgene manufacture.

PB 20087. HANFIELD, FRANCIS H. and others. The German ham canning industry. (BIOS Final Rept 299, Item 22). Mar 1946. 24 p. Price: Microfilm-50¢ - Photostat-$2.00
A number of German ham canning factories were visited but since no canning was being done at this time the information presented in the report is that obtained from questioning factory personnel. Information is given on the curing, processing and cooking of the hams. Appendix gives detailes obtained at individual targets. Formulae of brines and amount of liquid injected and cooking times and temperature varied considerably. One of the principal factories engaged in prewar export of canned hams to U.K. used the patented Beisser method of curing. Drawings of Klinghammer can-closing machine used were removed but are not included in this report.

PB 19664. GREAVES, C. Production of alcohol and yeast from coniferous woods. (BIOS Evaluation Rept 402) Feb 1946. 2 p. Price: Microfilm-50¢ - Photostat-$1.00
This report describes the process by which sawdust or wood shavings of coniferous woods could be converted to ethyl alcohol or dry yeast. The plant of Holzverzuckerungs G.m.b.H., Holzminden, ordinarily uses 1750 metric tons and can produce either 300,000 liters of alcohol or 250 tons of yeast. The process is described very briefly and includes the conversion of wood to sugar, alcoholic fermentation, and yeast fermentation. At present, no wood is processed but the yeast plant is operating on beet molasses.

PB 19681. LAWRENCE, G. N. and others. Dehydrated potatoes and vegetables. (BIOS Final Rept 186, Item 22). Dec 1945. 138 p. Price: Microfilm-$1.50 - Photostat-$10.00
About thirty plants in Germany produced dehydrated potatoes and vegetables. In addition great quantities were imported from Holland and France. A wide lag existed between technical knowledge of foods and their applications. Maximum production was favored over quality and although standards were set rather high, the factories in general did not produce food of very high quality. The work of the Institute of Food Research, Munich, is discussed, this being an association of food packers for mutual benefit. This organization was concerned with the processing and protection of all types of foods. The process of dehydrating foods is described. The investigators thought very highly of the several types of dryers used. Tables show the results of tests on the various dryers. Diagrams and glossary are included.

PB 25543. ORENT-KEILES, ELSA and others. The vitamin and mineral values of vegetables as served in an Army mess. Final report. Mar 1946. 7 p. Price: Microfilm-$1.00-Photostat-$1.00
This report contains the results of a study made of the vitamin and mineral values of vegetables as served in an Army mess hall. One hundred and fifteen samples including potatoes, sweet potatoes, cabbage, carrots, kale, lettuce, spinach, and tomatoes were analysed. The nutrients studied consisted of ascorbic acid, carotene, nicotinic acid, riboflavin, thiamine, calcium, phosphorus, and iron. The maximum, minimum, and average contents of the nutrients in the vegetables as served are presented in tables appended to the report. The vitamin and mineral content of the vegetables prepared at this Army mess appeared to be in good agreement with average values compiled for data described in the literature and reported in standard food composition tables.

PB 21851. U. S. WAR DEPARTMENT. QUARTERMASTER BOARD. Report of eggs, whole, dehydrated, compressed. (Project T-218) Aug 1943. 7 p. Price: Microfilm-50¢ - Photostat-$1.00
It was concluded from tests conducted at the Cooks, Mess Sergeants, and Mess Management Schools at Camp Lee, Virginia, that: 1 - whole, dehydrated, compressed eggs, if finely sifted, reconstitute more easily than dried eggs; 2 - dehydrated compressed eggs are superior to the dried eggs with regard to palatability and color; 3 - the dehydrated compressed eggs are satisfactory as a leavening agent and impart a more natural egg color to the product in which they are used than do dried eggs; 4 - the present size (1 lb. for 17 men) and type package appears to be satisfactory for field and garrison use. The tests and findings are described in detail and suggested directions for using this type of egg are given.

PB 20564. U. S. WAR DEPARTMENT. QUARTERMASTER BOARD. Report of test of vegetables, dehydrated (Canadian method) QMB T-1261. (Project T-211) Aug 1943. 9 p. Price: Microfilm-50¢ - Photostat-$1.00
Procedure and findings of tests are described. It is recommended that the palatability of the vegetables, dehydrated by the Canadian process, be considered equal to vegetables dehydrated by the U. S. process, unaged, but slightly superior when aged. It was found that flavor of vegetables dehydrated by Canadian process is less pronounced than those treated by U. S. process. They are also more acceptable in color and are prepared in same manner. Because package was not found satisfactory for field use it was recommended that the vegetables be packaged in units of 100 servings, and the can be so constructed that it can be resealed, thus protecting any unused contents from the air.

PB 20549. U. S. WAR DEPARTMENT. QUARTERMASTER CORPS. RESEARCH AND DEVELOPMENT BRANCH. MILITARY PLANNING DIVISION. Proceedings of the Subsistence Research and Development Laboratory conference no. 1: The biochemistry of the deteriorative changes in dehydrated foods. 1945. 84 p. Price: Microfilm-$1.00 - Photostat-$6.00
This document contains the papers of 19 authors, some papers being in abstract form, which were presented at a meeting of the Military Planning Division of the Office of the Quartermaster General with investigators from industry, army, university and government laboratories to discuss the problems pertaining to storage deterioration and its control. This report does not constitute an official scientific publication as the various authors will no doubt publish their material in regular journals and bulletins wherever desirable. The subjects treated are as follows: Biochemistry of deteriorative changes occurring in dehydrated foods--Military implications; Objectives; Maillard reaction; Enzyme studies and the discoloration of dehydrated potatoes--Parts I and II; Enzyme studies on white potatoes; British studies of deteriorative processes in dried vegetables, milk and eggs; Some quality changes occurring in dehydrated meat, milk and eggs; Summary of New Zealand and Australian investigations; Psychometrics; Some methods used in studying the deterioration of dried soups; Summary of investigations on biochemistry of deteriorative changes in dehydrated eggs; Powdered milk; Spoilage of fats in dried milks; Dried fruits--deterioration of dried apricots; Significance of moisture content in dehydrated vegetables; Dehydrated potatoes; Deteriorative changes in some food specialties; and Industrial implications.

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FUELS AND LUBRICANTS

German

PB 19700. GREAVES, C. Report on visits to (1) The Technical High School, Darmstadt; (2) C. F. Boehringer and Söhne, Mannheim-Waldhof; (3) Dr. Freudenberg, Heidelberg University; (4) Dr. Wolman, Wood preservation specialist, Bad Kessingen; (5) Imbert Gas Producer Plant, Cologne. (BIOS Final Rept 216, Items 22,30). Oct-Nov 1945. 11 p. Price: Microfilm-50¢ - Photostat-$1.00

The Darmstadt Technical High School was visited in connection with used of wood pulp. A log barker was seen which was quick acting and did not waste wood. A wall board was also inspected composed of 50% flax stems and 50% flax stems and 50% wood pulp. This was not equal to that of 100% wood fiber. Dr. Jayne informed the group that lignin still had limited uses. C. F. Boehringer und Söhne were next visited. No details were obtained on the proposed process for the production of vanillin from waste sulphite liquor. Dr. Freudenberg of Heidelberg University outlined his plan for the hydrogenation of lignin obtained from waste sulphite liquor. These treated lignins might be used as plasticisers of softeners for artificial resins. Dr. Wolman, when interviewed in regard to wood preservation, stated that prior to the war most preserved wood was treated with creosote or Wolman Salts. After the war, only Wolman Salts would be used as Diesel oils made from creosote would fetch a much higher price than the creosote itself. Most producer gas generators in Germany were made by Imbert. The method of heating brown coal, wood or lignite to produce the gases and their use in gasoline passenger cars, trucks and Diesel engines were described. These generators were used solely because the price of gasoline was so high.

PB 19441. SCHNEIDER. Herstellung von hochdruck-schmiermitteln unter benutzung von ultraschall. (Use of ultrasonic waves in production of high pressure lubricants). (Reichsforschungsrat). (ALSOS Mission, HFR 507 37). Jan 1945. 10 p. Price: Microfilm-50¢ - Photostat-$1.00

Starting from the known fact that emulsions and supensions of liquid and solid bodies can be produced in liquid media with the aid of ultrasonic sound waves, the author attempted to ionize sulfur in an ultrasonic field, and to condense the unsaturated constituents of lubricating substances in such a way as to produce a highly polymerized, extremely viscous lubricant. The results showed that no very significant structural changes were produced in the lubricants. The author suggests that greater intensities of sound and different frequencies might bring about better results. To this end the experiment is to be repeated with a 3000 - 6000-watt transmitter. Tables and graphs are given. In German.

PB 19396. SCHWARTZ, W. Erdölbakteriologie, Reichsforschungsrat (Bacteriologic study of petroleum). (ALSOS Mission, HFR 506 8) Dec 1944. 1 p. Price: Microfilm-50¢ - Photostat-$1.00

This report describes very briefly microscopic examination and bacteriologic culture tests of forty-four samples of petroleum taken from petroleum risers or tanks in the oil regions of Maikop on the Taman peninsula, in the Caucasus, as well as in Weingarten, Hanover, (Wiedhagen, Mölme, Rietze), Pechelbronn and Heide, revealed the presence of the usual aerobes, aerobic paraffin cleavage bacteria, anaerobes, and desulfuricants in all 44 samples. Certain individual samples also contained some fungi (yeasts, aspergillaceae, fungi imperfecti, etc.) The bacterial content of the riser oil was higher than that of the tank oil probably as a result of infection during the drilling process. As a result of this study a teter method is being developed which will indicate the best places for the location of petroleum storage tanks. In German.

PB 19391. SPENGLER, GÜNTER. Trennung von kohlenwasserstoffen mit hilfe der selektiven adsorption, Reichsforschungsrat (Separation of hydrocarbons by selective adsorption). (ALSOS Mission, HFR 506-14) Jan 1945. 1 p. Price: Microfilm-50¢ - Photostat-$1.00

This is a brief report of an extensive study made by the author of the separation of hydrocarbons by adsorption. The method, he says, can be applied technically for testing and evaluating gasolines, diesel oils, crude oils, and fractions. In German.

PB 19388. STILLE, H. Karpathentektonik. (A short report on the tectonic structure of the Carpathian Mountains) (Reichsforschungsrat). (ALSOS Mission, HFR 506 17). Dec 1944. 3 p. Price: Microfilm-50¢ - Photostat-$1.00

This short preliminary report, dated Dec 12, 1944, refers to the actual war situation and discusses briefly attempts made to determine possible sources for petroleum through geological investigations in the West Carpathian mountains. Another report giving more detailed information is announced.

PB 18582. WILKINS, R. T. The methanisation of coal gas, information obtained from Dr. Martin of Ruhrchemie A.G. and from Dr. Treenckner of Ruhrgas A.G. (CIOS File XXIII-5, Item 30). Jul 1945. 7 p. Price: Microfilm-50¢ - Photostat-$1.00

Report describes a method for effecting the catalytic methanisation of coal gas, and states that plants for operating this process on the scale of 6,200 cu. ft. per hr. have been installed at roadside filling stations. These stations supplied the processed gas, compressed to 300 atmospheres for use as moter fuel. The plants were designed to be fool proof so that they could be operated by a non-technical filling station attendant. They were also capable of being easily started and stopped as required by the erratic demand by road vehicles. The process had two objectives: to increase the town's gas calorific value from 450 and 500 to between 550 and 850 B.T.U. per hour, to remove constituents of the gas which had a corrosive effect on high-pressure storage vessels. These constituents were CO, HCN, O2 and sulphur compounds. The process involved the following treatment: (1) Boosting of town's gas to a pressure sufficient to pass it through the plant; (2) heating to a temperature of 400-450°C.; (3) addition of steam (in certain cases); (4) catalytic conversion of organic sulphur compounds to hydrogen sulphide; (5) cooling; (6) removal of hydrogen sulphide; (7) methanisation; (8) cooling; (9) compression to 350 atmospheres. The operation of the methane reactor and the preparation of the catalyst (Ni and MgO in kieselguhr) are described. A flow diagram is included.

Japanese

PB 21879. CAMERILL, C. M. and others. Examination of enemy material: Analysis of captured Japanese ethyl fluid. Progress report 55, Apr 8, 1944. (OSRD Rept 3703) May 1944. 6 p. Price: Microfilm-50¢ - Photostat-$1.00

A sample of ethyl fluid captured from the Japanese at Lae, New Guinea, September 16, 1943, and received from the United States Navy Department of Operations, Captured Enemy Equipment Section, was analyzed by Ethyl Corporation. The results of this analysis indicate the fluid either is an exact duplicate of aviation fluid sold by or is an aviation fluid previously obtained from them. The fluid in the ampoule weighed 659 g., equivalent to 374 cc., and was analyzed for total lead, tetraethyllead, ammonia-soluble lead, and bromine. The results of these analyses are tabulated. Intructions on container for mixing fluid are translated. Photographs of Japanese ethyl fluid package and glass ampoule are included.

United States

PB 22399. BECHEL, ERNEST R. Lubricants for fire control instruments: First partial report. Research item 800.0. (Frankford Arsenal Ordnance Lab Rept 39). May 1940. 24 p. Price: Microfilm-50¢ - Photostat-$2.00

A description is given of the fire control instrument problems leading to the installation of a grease testing division of the F. A. Ordnance Laboratory. The lack of standardized tests for chemical stability of greases required a survey of the most commonly accepted methods. The result was

the adoption of the Norma-Hoffmann oxygen bomb test as representing the most advanced technique. A detailed description of the apparatus and method of test is given. In addition, a test method for low and high temperature properties is included. Drawings of the apparatus and a graph are included.

PB 22398. SHEAD, J. L. and GISSER, H. Lubricating oil for synchronous units: First report. (Frankford Arsenal Ordnance Lab Rept R-661). Oct 1945. 26 p. Price: Microfilm-50¢ - Photostat-$2.00
Representative available lubricants were subjected to a series of tests in synchronous units, involving storage followed by angular error measurements, in order to determine the best type of lubricant and the factors involved in achieving satisfactory lubrication. It was demonstrated in these tests that AXS 1513 oil, having optimum oxidation stability and rust preventive properties was the best of the products studied, but that none of the available lubricants was adequate for either storage or service of synchronous units. It was also demonstrated that some degree of corrosion protection is required in active service or storage and that fatty oils yielding gummy products on oxidation are to be avoided. Tests on a specially prepared grease indicated that grease lubrication may be feasible, but further work is needed. It is recommended that the use of AXS 1513 oil lubrication of synchronous units for both long-term storage and active service be continued. Photographs and tables are included.

PB 23767. U. S. NAVY DEPARTMENT. Oil, penetrating, with amendment 3, Jan 6, 1939. (Navy Aeronautical Specification O-2b) Jun 8, 1932; Jan 6, 1939. 3 p. Price: Microfilm-50¢ - Photostat-$1.00
This report consists of proposed U. S. Navy Department specification, (O-2b), for penetrating oil for aircraft use, with amendment. Specification covers grade of oil; material and workmanship; general detail requirements; methods of inspection, tests, etc.; and packing and marking.

PB 19100. U. S. WAR DEPARTMENT. Handling petroleum products. (Tech Manual 10-466) Feb 1946. 100 p. Price: Microfilm - $1.00 - Photostat - $7.00
This manual was designed as a practical aid to officers and enlisted men of the Quartermasters Corps who have the responsibility of moving gasoline, oil, and grease from the refineries in the zone of the interior up to the using units in theaters of operation. Particular emphasis is laid upon safe and approved methods of handling and storing the commonly used petroleum products. The information is arranged under the following sections: Petroleum products; petroleum handling personnel; handling facilities, such as tankers, pipe lines, containers, equipment, etc.; receiving and dispensing fuels; storage of petroleum products; fire protection; other operating hazards, such as inhaling vapors, injury to skin and eyes, etc.; contamination of petroleum products; volume adjustments; and camouflage and demolition. Appendices include useful information on standard weights and measurements of petroleum products and their containers, approved layouts for bulk break-down points, suggested methods of marking containers, etc. Photographs and drawings are included.

INSTRUMENTS (PROFESSIONAL, SCIENTIFIC AND CONTROLLING)

German

PB 4799. BOPP & REUTHER G.M.B.H., MANNHEIM, GERMANY. Oval wheel meters. n.d. 42 p. Price: Microfilm - 50¢ - Photostat - $3.00
Oval wheel meters are used in all instances where absolutely correct and quick metering of volumes is required. The function and design of this oval wheel gear meter is fully described in this sales catalog. The meters are used in large chemical plants for measuring aggressive viscous, and poisonous light and heavy substances; in storage, transport and sale plants for measuring all sorts of power fuels and lubricating oils; in stationary internal combustion engines and marine engines for continuously controlling fuel consumption; and in aeroplanes, motor cars and railway motor cars for ascertaining fuel consumption and contents of fuel tanks. The meters operate in working temperatures ranging from -50°C.up to 200°C., for pressures up to 100 ats. and rates of flow from 2 to 600,000 litres per hour. The catalog contains numerous diagrams, photographs, and charts,and descriptions of dials and recording and indicating instruments.

PB 16336. I. G. FARBENINDUSTRIE. Einfaches strömungsmanometer mit grosser genauigkeit (Simple flow meter with high precision). (Enlargement print of part of microfilm 182-5) May 1943. 1 p. Price: Microfilm-50¢ - Photostat-$1.00
Description of a device which holds constant the speed of a flowing gas even under changing flow resistances. In German.

PB 19270. MCCLURE, J. D. German industrial jewel bearing production. (BIOS Final Rept 80, Item 21) Oct 1945. 19 p. Price: Microfilm-50¢ - Photostat-$2.00
Report of visits to four plants engaged in preparing stone jewels for industrial use. The report describes the various operations at the Junghans plant at Dunningen. This plant makes 1,000 sets of 15 jewels for watches per day. The Saphirwerke-Schleiferei at Elzach makes meter cups conical jewels, endstones, ringstones and sapphire needles. Rudolph Backes of Idar Oberstein produced only handwork. I. C. Wild of Tiefenstein made pallet stones, impulse pins and balance jewels. The jewel industry in Germany has not been in operation very long and their standards are not up to English or Swiss standards, but their rate of manufacture exceeds even the Swiss rate. The general economy of labor is good. Only the Saphir-Schleiferei plant at Elzach did not operate at a loss, leading the American investigators to believe that the Swiss must be subsidized, directly or indirectly, in order to produce at their low price. No drawings shown.

Japanese

PB 17533. GRUBBS, R. W. Japanese observation periscope 15 meter experimental. (Japanese ordnance equipment). (Tech. Intelligence Rept 122) Dec 1945. 2 p. Price: Microfilm-50¢ - Photostat-$1.00
Four sections of a Japanese experimental, 15 meter observation periscope were found on Honshu, Japan. Through plans that were found, it is known that it was intended to be twenty power but as that was too powerful for field use, it was redesigned to be either 15 or 7 power by rotation of the base to individual eye-pieces. The complete item consists of ten sections, each approximately one and a half meters in length and may be either nine or twelve meters by removal of sections numbered 3,4,5, and 6. The line of vision may be adjusted by changing the tilt of the angle of the objective mirror by a rod which runs along the outside of the tube, connected to a gear in the objective window assembly. The sections are constructed of duraluminum, held together by screw clamps and is easily assembled. It was originally designed for use with heavy artillery. An overall blue-print was found with the sections. A photograph and drawing of the item are attached to the report.

PB 17831. MINES, F. A. Radio equipment for Japanese bombing balloons. Feb 1946. 6 p. Price: Microfilm-50¢ - Photostat-$1.00
The purpose of this report is to cover all known details of the radio and meteorological equipment used with the balloons and to correct previous reports on this subject. (All details of this report tie in with previous information known to be true and it is believed that all statements are entirely accurate insofar as the knowledge of Major Takano permitted. He was not, however, allowed in any of the operational areas so some details are stated as conjectures or estimates.)

United States

PB 22107. ATKINSON, R. d'E. On calibrating a lens by visual plotting, using a single star. (Aberdeen Proving Ground Ballistic Res Lab Rept 506). Dec 1944. 22 p. Price: Microfilm-50¢ - Photostat-$2.00
A method of calibrating fairly long-focus lenses is described, based on intermittent visual plottings of one bright zenith star for several hours. The method entails less computation than is required if a large number of stars are photographed at one time; that procedure would also require an inconveniently large film, with the lenses contemplated. The analysis is given for the general case, and is then applied in detail to measurements which were made with the 120" lens of the Vertical Camera Obscura on the evening of Aug 24, 1944, using Vega. The "calibrated focal length" is found to be somewhat different from that actually in use with this lens, but the difference is mainly due to a change in the assumed distortion formula; small corrections to the assumed position of the "base", and the assumed azimuth of the baseline as drawn on the table are also obtained. The distortion can also be estimated by this method, but if Vega is used it is desirable to extend the plotting-paper for this purpose; the distortion is still small at 30 inches from the origin, at which distance Vega runs off the edge of the paper. A simple approximate method of reducing the measures is developed, which is much less laborious than a least-squares solution and gives results (in the present case) differing from it by less than half the probable errors. As a by-product of this work, the latitude and longitude of the Vertical and Oblique Cameras, and the azimuth of the line joining them, were investigated, since existing records seemed conflicting. The results are given in appendix I. A graph is included.

PB 18075. COLUMBIA BROADCASTING SYSTEM, INC. Operating instructions for Navy type RDL "Blinker" receiver, CBS 152-D. n.d. 17 p. Price: Microfilm-50¢ - Photostat-$2.00
The Navy type RDL "Blinker" receiver is UHF instrument used for measuring the frequency of radar signals in the band from 300 to 600 mc. Fundamentally the receiver consists of three sections: the RF tuner, the IF amplifier, and the pulse amplifier. A small neon light is mounted on the front rotating tuning dial to give a panoramic visual indication of a radar signal. In addition, a jack is provided so that headphones may be used for an audio check at the same point. Circuit diagrams and a photograph are included in this instruction book.

PB 20611. FOX, PAUL L. Shell deflection gage. First report. (Frankford Arsenal Ordnance Lab Rept R-149). May 1942. 38 p. Price: Microfilm-50¢ - Photostat-$3.00
A gage was designed and constructed for measuring the wall deflection (contraction of diameter) of a shell when being fired from a gun. Measurements on present design of 105 mm shell heat treated for various yield strengths using this gage show that the maximum deflection is independent of the heat treatment of the shell for the range above about 55,000 p.s.i. yield strength. Permanent deflections increase rapidly with reduction in yield strength below 55,000 p.s.i., until they correspond to the total deflection. Internally and externally measured permanent deflections are in approximate agreement, for yield strengths above 55,000 p.s.i. indicating negligible upsetting of material at the rotating band. At low yield strengths there is a definite upsetting. Tables and drawings are included.

PB 22578. HENNESSY, R. G. Electrical characteristics of audio oscillator in the model RDJ-1 pulse analyzer. (Naval Research Lab Rept R-2743). Jan 1946. 5 p. Price: Microfilm-50¢ - Photostat-$1.00
The audio calibration oscillator of the model RDJ-1 pulse analyzer was checked for frequency stability under conditions of varying temperature and humidity for accuracy of oscillator dial calibration and harmonic voltage content. The dial drive vernier ratio has been increased to give a finer control in determining pulse repetition frequencies. This higher ratio is more satisfactory than that used in the X-RDJ and RDJ pulse analyzers. The results of the test were considered satisfactory.

PB 20612. HINE, T. B. The theory of the flowmeter type continuous gas analysis apparatus. (Edgewood Arsenal Chemical Div Rept 54; Physical Dept Rept 9) Aug 1921. 14 p. Price: Microfilm-50¢ - Photostat-$1.00
The purpose of the work was to investigate the theory of the flowmeter type of recording gas analysis apparatus in order to ascertain the range of gas concentrations to which it may be applied and also the arrangement of apparatus which will give a desired accuracy in a given range. Both streamline (low rates of flow) and turbulent (above critical rates of flow) flow are considered.

PB 21115. McMILLEN, E. L. and CARVER, E. K. The mechanized Gardner mobilometer. (OSRD Rept 6234). Oct 1945. 24 p. Price: Microfilm-50¢ - Photostat-$2.00
This report describes a 6 place mechanized mobilometer, used for evaluating the quality of Napalm and other incendiary gels for use in flame throwers and bombs. Gardner consistency is determined by measuring the maximum force exerted upon a tubular push-pull type of spring by the descent of the Gardner disc, during its second downward travel through 4 inches of the gel sample. This instrument can test 18 to 24 samples per hour or 36 to 48 with duplicate tubes, as compared with a rate of 3 or 4 per hour for the original instrument. A description of the workings of the equipment and its development by the Eastman Kodak Co., is followed by tables of test results from various plants, photographs and curves.

PB 6654. POST, RICHARD F. A proposed high-energy particle accelerator - The Cavitron. Jan 1946. 3 p. Price: Microfilm - 50¢ - Photostat - $1.00
This letter report explores the potentialities of an accelerator of much different physical design from the cyclotron, betatron, or synchrotron, compact in construction, and in principle capable of producing much higher peak energies than are at present available. The accelerator is to be iron-less, and is to employ resonance acceleration achieved by slow increase of the guiding magnetic field. High intensity electric accelerating fields are to be obtained by replacing the usual "dee" assembly and acceleration chamber by a cavity resonator, similar to types now commonly employed in radar. A possible design for a 500 MEV electron accelerator is outlined.

PB 22357. U. S. WAR DEPARTMENT. Aerograph equipment AN/AMQ-2. (Tech Manual 11-2408). Apr 1945. 118 p. Price: Microfilm-$1.50 - Microfilm-$8.00
This manual describes and gives instructions for installation and assembly, operation and maintenance of the aerograph equipment. This equipment, designed for installation on long-range, high-speed aircraft, is used to obtain accurate records of pressure, temperature, and humidity in the atmosphere, together with the air speed of the aircraft. The range of measurement of the aerograph equipment is as follows: Temperature - from -70°C. to +50°C.; relative humidity - from 10% to 100%; pressure - from 200 millibars to 1060 millibars; air speed from 70 miles per hour to 300 miles per hour. Photographs, graphs and drawings illustrate the text. A maintenance parts list is included.

PB 22364. U. S. WAR DEPARTMENT. Audio oscillator TS-312/PSM-1; Hewlett-Packard model 200CR. (Tech Manual 11-2684 Supp). Jun 1945. 9 p. Price: Microfilm-50¢ - Photostat -$1.00
This is a supplement to TM 11-2684 and contains appendices on equipment changes and preventive maintenance. There is also a manufacturer's instruction book for the Hewett-Packard audio oscillator, models 200C and 200CR, giving circuit description, operation and maintenance instructions, parts lists, photographs, and diagrams.

PB 22064. U. S. WAR DEPARTMENT. Barometers ML-2 through ML-2-F; cases ML-48 through ML-48-E. (Tech Manual 11-428). Oct 17, 1944. 71 p. Price: Microfilm-$1.00 - Photostat-$5.00

The inch scale on barometers ML-2, ML-2-A, ML-2-B, ML-2-C and ML-2-E cover a range from 24 to 32 inches, barometer ML-2-D from 19 to 32 inches, and barometer ML-2-F from 22 to 32 inches. This manual includes a description of the items and instructions for installation and operation, functioning of parts and maintenance. Supplementary data include tables and explanations, and maintenance parts lists. Photographs are included.

PB 22251. U. S. WAR DEPARTMENT. Psychrometer equipment ML-313/AM. (Tech Manual 11-2415). Mar 5, 1945. 58 p. Price: Microfilm-$1.00 - Photostat-$4.00
Subject equipment measures, from an airplane in flight, the wet- and dry-bulb temperatures of the air. The relative humidity, dew point, vapor pressure, and temperature of the atmosphere at the level of flight may be determined from the thermometer readings. This manual presents description of equipment, and instructions for installation, assembly and operation, preventive maintenance and repairs. Appendix contains list of maintenance parts, references and a glossary. Photographs and exploded views of equipment are included.

PB 22065. U. S. WAR DEPARTMENT. Supports ML-29-B, ML-29-D, ML-29-E; anemometers ML-80, ML-80-A, ML-80-B; indicators ML-117, ML-117-A, ML-117-B. (Tech Manual 11-424). Sep 12, 1944. 54 p. Price: Microfilm-$1.00 - Photostat-$4.00
Subject instruments are described in this manual. Any combination of one support, one anemometer, and one indicator, with the necessary wire and power supply, comprises a complete system for indicating surface wind direction and for measuring and indicating surface wind speed. Manual contains instructions for installation, operation and maintenance. Supplementary material contains maintenance parts list for support ML-29-B or ML-29-E, anemometer ML-80 or ML-80-B, and indicator ML-17 or ML-117-B. No maintenance parts are furnished for support ML-29-D, anemometer ML-80-A, or indicator ML-117-A. Photographs and drawings are included.

PB 22362. U. S. WAR DEPARTMENT. Test set TS-303A/G; RCA Chanalyst No. 1620. (Tech Manual 11-2659). Feb 1945. 36 p. Price: Microfilm-$1.00 - Photostat-$5.00
The RCA-Rider Chanalyst is a device whereby it is possible to trace the passage of a signal through a radio receiver, establish the character of the signal in any portion of the radio receiving or amplifying system, and to identify the nature and location of the fault existing in the receiver or amplifier with maximum accuracy and the greatest possible speed. To accomplish this end, the Chanalyst contains a series of electrical circuits whereby it is possible to probe in every circuit of the receiver without interfering with its operation. This manual contains instructions for the use of this test set. Photographs and diagrams are included.

LEATHER AND LEATHER PRODUCTS

PB 21128. GREENE, H. S. Sterilization of used Army shoe leather: Progress report to Feb 15, 1943. (OSRD Rept 1218) Feb 1943. 14 p. Price: Microfilm-50¢ - Photostat-$1.00
This progress report covers the work that has been completed at the University of Cincinnati on the aerobic microbiological flora of used Army shoe leather and the sterilization of such leather by the use of formaldehyde vapor. From used Army shoe leather, 18 different species of aerobic bacteria and nine species of molds were isolated and studied. A procedure suitable for use in large-scale decontamination is given, and it is believed this method would prove effective, practical and economical since it requires little equipment and no technical management in its operation. It has been found that all the nonspore-forming bacteria used could be killed with formaldehyde vapor within a treating period of thirty minutes. For the molds, the killing time was within sixty minutes and for the spore-forming bacteria (represented by Bacillus cereus) within ninety minutes.

PB 17106. SCRUTON, H. A. Manufacturing test for making protective shoes. (CWS Tech Div Memo Rept 25) Dec 1935. 11 p. Price: Microfilm-50¢ - Photostat-$1.00
From the results of this manufacturing test it was concluded that: a. No insurmountable difficulties are contemplated in manufacturing the impermeable protective shoe E1R5 with the usual shoe factory equipment, methods, and materials. b. The most practicable stage of normal shoe manufacturing practice at which to impregnate the leather for the manufacture of impermeable protective shoes E1R5 is as follows: Impregnation of leather for uppers prior to cutting and the impregnation of the leathers for the outersoles, slip taps, bottom fillers, and Goodyear welting either prior to cutting or as unassembled cut components. c. The impermeable protective shoes E1R5 should be constructed with unimpregnated innersoles, counters, and heels in order that normal shoe manufacturing practice may be closely adhered to and permit the production of protective shoes that comply more closely to the existing Army specifications for service shoes. d. The customary shoe factory operations of scouring and staining of outersoles and heels, and the cleaning, filling, waxing, and polishing of uppers should be considered unessentials that can be eliminated in the manufacture of protective shoes. e. The shoe factory cost of manufacturing shoes from leather impregnated prior to cutting should not exceed that of the manufacture of shoes from unimpregnated leather.

PB 23473. STEADMAN, FRANK M. German-English technical dictionary for the leather industry. (FIAT Final Rept 157) Mar 1946. 124 p. Price: Microfilm-$1.50 - Photostat-$9.00
This is a compilation of leather industry technical terms in German with English equivalents. The original intention of the compiler had been to prepare an English index, but only the German index is available. The index section key numbering system has been carried over from an earlier compilation through the edition from which this report is copied. The desired word is located by consulting the index for the key number, turning to the section by the first part of the key number, and locating the definition by the second part of the key number.

PB 22694. U. S. WAR DEPARTMENT. Fitting of shoes and socks. (Tech Manual 10-228). Feb 1946. 51 p. Price: Microfilm-$1.00 - Photostat-$4.00
This manual establishes uniform procedures for the measurement of foot sizes and for the fitting of shoes and socks. It applies to all shoes, boots, socks, and stockings of quartermaster issue. Contents are as follows: I. Importance of proper shoefitting; II. shoe-fitting methods, III. foot-measuring equipment and procedure; IV. special measurement shoes and orthopedic appliances; V. sock fitting and size correlation; VI. size data for boots and shoes, including approved sock combinations. Photographs, diagrams and tables are included.

LUMBER AND WOOD PRODUCTS

PB 22577. FLEISCHER, H. O. and SEDGRO, R. M. A pole-railway system for transporting logs. (FIAT Final Rept 385). Aug 1945. 5 p. Price: Microfilm-50¢ - Photostat-$1.00
A pole railway constructed by Dr. Baeseler of the German Railway System and used to transport wood out of mountainous country is described. The railway is composed of a single overhead rail. Portions of this rail are made of wooden poles, supported by either trees or simple wooden frames. Other portions consist of cables, which traverse ravines or treeless areas where the construction of the pole rail would be difficult. The carriage consists of a basket type container hung on a chassis which is suspended on two wheels riding on the track. The carriage is pulled along the track by a cable and winch, driven by an electric motor. With the aid of this railway firewood is transported for a distance of about 600 feet with a change in elevation of about 250 feet. Dr. Baeseler proposes to use this newly developed sys-

ten to transport firewood, pulpwood, and logs in mountainous areas or across marshy ground. He believes that it can be modified to make use of mechanical equipment such as hydraulic controls and accumulators. On level ground he proposes to transport entire trains of logs. The investigators believe that in America, where the degree of mechanization of logging operations has been highly developed, the railway would be applicable only in exceptional cases.

PB 22185. GREAVES, C. Pressed wood and plywood plants at Stadthagen, Troisdorf, Mannheim and Wendlingen. (BIOS Final Rept 235, Item 22). Feb 1946. 14 p. Price: Microfilm-50¢ - Photostat-$1.00
The report discusses the products of four plants. The pressed wood and plywood plant of Otto Bosse, Stadthagen had manufactured cigar boxes before the war. During the war its plywood products were used for aeroplane construction. Presshols made from German beech veneers was used for airscrews, for molds for light metal parts of planes and for gear wheels. Schichthols, also made from German beech veneers, was used for rifle furnishings. At the time of this report the firm was beginning to build prefabricated houses. Dynamit A.G., Troisdorf, produced pressed wood known as Lignofol and variable density pressed wood which was used at other factories for the production of air screws, molds, gear wheels, etc., and Trolitax, a compressed paper board. The plywood and pressed wood plant of Shutte Lanz at Mannheim-Rheinau produced plywood, blockwood for air screws, and wallboard. The Erwin Beyer plant in Wendlingen made wood plates and bowls and furniture. Both plywood and solid wood were used.

PB 18925. GREAVES, C. Wood distillation plant at Brilon-Wald. (BIOS Final Rept 128, Item 22). Nov 1945. 8 p. Price: Microfilm-50¢ - Photostat-$1.00
The company owning this plant is called Degussa, and is the main producer of wood distillation products in Germany. The process used is known as the Reichert. The wood, cut to 25 cm lengths is charged into the carbonizing retort. The incoming wood has a moisture content of about 20 percent, and is first dried by passing through the retort hot gases of combustion at a temperature of 180 to 200°C. for 10 to 15 hours. After drying the wood is carbonized with circulating gas which is continuously heated to a temperature which varies with the kind of charcoal to be produced. The carbonizing period is from 25 to 35 hours. The condensed liquids from the carbonization, consisting of water, acetic acid, alcohol and tar are distilled, and the final product is methyl alcohol of 70 percent by weight. The residual liquor in the still, consisting of water, acetic acid, tar, and no methyl alcohol, is blown through the condenser and pumped cool into settling vats, where the tar falls to the bottom, and the crude diluted acetic acid is drawn off from the top. Charcoal briquettes are made with two different bonding materials: starch and wood tar. The plant capacity for making activated charcoal (Act.C.) is 75 tons (metric) per month. Charcoal is ground until not more than 2 percent is retained on a screen having 6400 holes per sq cm. This fine charcoal is mixed for 20 minutes with wood tar in the proportions of 120 kg to 95 kg of tar. The viscosity of the tar at 60°C. is 25° Englen, and the coke residue is 20 to 30 percent. Decolorizing Act. C. for the sugar industry is made either exactly as industrial Act.C. and then ground to the desired fineness, or fine charcoal is activated directly and then ground. Act.C. for industrial purposes is used mainly to absorb gasoline in the Fischer-Tropsch process and for the extraction of benzol from coal gas. Diagram showing Reichert process of carbonization is included.

PB 19671. LACEY, P. M. C. Compressed wood for textile shuttles. (BIOS Evaluation Rept 417) Feb 1946. 2 p. Price: Microfilm-50¢ - Photostat-$1.00
Deutsche Holzveredelung, Wurdinghausen nr. Altenhunden, Westfalia, manufactures compressed wood (Edelwood) for textile shuttles, liquid-resin-bonded laminated wood for picking sticks (Dehonit), and film glued laminated wood (Dehofol) for general purposes. Gebr. Schseing, Weseke nr. Borken, manufacturers shuttles and other textile machinery parts from Edelwood (compressed beech) and other products supplied by Deutsche Holzveredelung. Holzveredelung G.m.b.H., Altenberge, Haren-on-Ems, also manufactures textile shuttles and other textile machinery parts from compressed beech. Beech blocks (with 9 to 10 percent moisture content) of fixed length and fixed weight are first compressed cold to a standard thickness and then pressed under high temperature to a standard thickness in the other direction, thus making a material of fixed density. For most other purposes compression in only one direction is used, and instead of solid timber, several pieces spread with phenolic resin glue are used. Double compression for the shuttles results in a material which splinters less than the single pressed material. The firm has developed a vacuum seasoning process which seasons beech in two weeks, with great improvement in quality.

MACHINERY (EXCEPT ELECTRICAL)

German

PB 19052. ALT. Kurvengetriebe im verarbeitungsmaschinenbau, insbesondere bei munitions-verpackmaschinen. Reichsforschungsrat. (Curved driving gears used in the construction of machinery, especially for ammunition packing machines). (ALSOS Mission, Gerlach 1) Mar 1944. 17 p. Price: Microfilm-50¢ - Photostat-$2.00
This is a progress report in German given by Dr. Alt of the Institut für Getriebelehre. (Research institute for motive power engineering) at the Technische Hochschule Berlin to the Reichsamt für Wirtschaftsausbau (Office for economic development). The report covers the development of simplified curved driving gears with reduced use of critical materials and increased efficiency. Diagrams are included.

PB 4805. BOPP & REUTHER G.M.B.H., MANNHEIM, GERMANY. Stream line needle valves and metering stream line needle valves: Their action, construction and spheres of application. Aug 1937. 48 p. Price: Microfilm-50¢ - Photostat-$4.00
This sales catalog describes in detail the stream line needle valve and 62 figures and pictures with tables of dimensions show the valve and the various equipment as supplied.

PB 15504. DEMAG A. G., DUISBURG. Arrangement plan for Demag gearing for motorships. (Supp 26 to PB 15477) 1939. 6 p. Price: Microfilm-50¢ - Photostat-$1.00
Plan of a motorship drive.

PB 15498. DEMAG A. G.,DUISBURG. Demag nachrichten (The June, 1942 issue of the Demag house organ). (Supplement 23 to PB 15477). Jun 1942. 13 p. Price: Microfilm - 50¢ - Photostat - $1.00
Richly illustrated prospectus of heavy cranes for use in ports; hydraulic drives for heavy duty; heavy grapnels and Diesel equipment for high altitudes, and allied products of the firm.

PB 15486. DEUTSCHE SCHIFF - UND MASCHINENBAU A.G. Description and service instructions for single-acting two-stroke Weser/M.A.N. - Diesel engines of the G62u 42/58 type. 1937. 66 p. Price: Microfilm-$1.00 - Photostat-$5.00
A manual (in English) describing the features, operation and maintenance of this marine Diesel engine. Contains diagrams. This is supplement #6 to PB 15477, "German marine Diesel engine practice".

PB 15483. DEUTSCHE SCHIFF - UND MASCHINENBAU A.G., WERK. Schematische Pläne. M.S. "Java". (Schematic drawings of the motor ship "Java"). 1939. 45 p. Price: Microfilm-50¢ - Photostat-$3.00
A collection of 18 plans of piping and plumbing arrangements of the motor ship "Java". Legends are partly in Dutch. This publication is supplement no. 4 to PB 15477.

PB 15495. ERMSEN, E. Der Dieselmotor in der handelsschiffahrt: Heutiger stand und künftige entwicklung (The Diesel engine of the merchant marine. Its present state and future development). (Supplement 20 to PB 15477) 1943. 10 p. Price: Microfilm-50¢ - Photostat-$1.00
This is an article published in the 1943 issues of Schiff und Werft dealing with the development of the Diesel engine for merchantmen during the last 30 years. It contains the description and drawings of outstanding models and opens a view into future possibilities of Diesel motors in this field. Two pages of this article appear to be missing.

PB 15499. ERMSEN, E. Die entwicklung des U-boote-Dieselmotors auf der Fried. Krupp Germaniawerft A. G. (The development of the submarine Diesel motors at Fried. Krupp Germaniawerft A. G.) (Supplement 19 to PB 15477) May 1942. 15 p. Price: Microfilm-50¢ - Photostat-$1.00
This paper covers the development of Diesel motors in the Fried. Krupp Germaniawerft A. G. from 1902 to 1942.

PB 15494. GERMANIAWERFT, Kiel, Germany: Three Germaniawerft marine Diesel engine outline drawings. (Supplement ¢ 17 to PB 15477). (R. P. Mills, Shipbuilding Unit, TIIB, 3-46). 1937. 12 p. Price: Microfilm-50¢ - Photostat-$1.00

PB 15505. HOWALDSWERKE, A. G., KIEL. Anordnung der motorenanlage, M. S. "Robert Ley" (Arrangement of the power plant of motor ship "Robert Ley"). Supplement ¢27 to PB 15477. 1937. 1 p. Price: Microfilm-50¢ - Photostat-$1.00
This document is a drawing of the motor arrangements in the German motor ship "Robert Ley."

PB 15507. MACHINERY Plans of the M.S. "Drau". 1932-44. 93 p. Price: Microfilm-$1.00 - Photostat-$7.00
A set of 27 drawings, being plans of different machinery on the German diesel ship "Drau". A list of the drawings is attached. Some of the plans may reproduce poorly. This is Supplement ¢29 to PB 15477, "German marine Diesel engine practice."

PB 15496. MASCHINENFABRIK AUGSBURG - NÜRNBERG A.G. Beschreibung und Betriebsvorschrift für die Dieselmotoren M9V40/46C und M9V40/46CB (Descriptions and operational instructions for Diesel motors M9V40/46C and M9V40/46CB carried by submarines model 1XC and 1XD2). Vol. 1 (Supplement 21 to PB 15477). 1941. 128 p. Price: Microfilm-$1.50 - Photostat-$9.00
This report contains detailed descriptions of the two Diesel engines including drawings and graphs, its operation and instructions for maintenance.

PB 15487. MASCHINENFABRIK AUGSBURG - NÜRNBERG A.G. Description and service manual for single-acting two-stroke airless injection M.A.N. - Diesel engines types 06Z 52/70 and 08Z 52/70 reversible. 1937. 44 p. Price: Microfilm-50¢ - Photostat-$3.00
A service manual (in English) intended as a summary of points which are of special importance in dealing with M.A.N. Diesel engines. Contains description of the engine, operating and maintenance instructions. There are ten drawings. This is Supplement ¢9 to PB 15477, "German marine Diesel engine practice".

PB 15478. MASCHINENFABRIK AUGSBURG - NÜRNBERG A.G. Description and directions for operating the double-acting two-stroke M.A.N. - Diesel engines for propelling vessels, types DZu 53/76 with scavenging pump. 1937. 65 p. Price: Microfilm-$1.00 - Photostat-$5.00
A descriptive manual (in English) covering the operation and maintenance of this German Diesel engine. Drawings and diagrams are included. This is Supplement ¢10 to PB 15477, "German marine Diesel engine practice".

PB 15488. MASCHINENFABRIK AUGSBURG - NÜRNBERG A.G. Description of and directions for operating the double-acting two stroke M.A.N. - Diesel engines for propelling vessels, types DZu 53/76, 60/90, 60/110 and 70/120 with airless injection. 1937. 39 p. Price: Microfilm-50¢ - Photostat-$3.00
An instruction manual (in English) on the operation and maintenance of these marine Diesel engines. Contains 9 drawings. This is Supplement ¢11 to PB 15477, "German marine Diesel engine practice".

PB 15492. MASCHINENFABRIK AUGSBURG - NÜRNBERG A.G. Directions for operating the M.A.N. - Diesel engines with airless fuel injection, types GVu 33 to 84 for stationary and marine service. 1938. 63 p. Price: Microfilm-$1.00 - Photostat-$5.00
Directions (in English) for operation and maintenance of the M.A.N. - Diesel engines, types GVu 33 to 84. Contains drawings and diagrams. This is Supplement ¢15 to PB 15477, "German marine Diesel engine practice".

PB 15489. MASCHINENFABRIK AUGSBURG - NÜRNBERG A.G. Instructions for the attendance of M.A.N. Diesel engines, four-stroke design, with airless fuel injection, type: VV (for electrical and air starting). 1936. 57 p. Price: Microfilm-$1.00 - Photostat-$4.00
A manual (in English) for the operation and maintenance of this type of marine Diesel engine. Contains diagrams of the equipment. This is Supplement ¢12 to PB 15477, "German marine Diesel engine practice".

PB 15490. MILLS, R. P. Beschreibung und betriebsvorschrift für die Dieselmotoren der Firma Fried. Krupp Germaniawerft A.G., Kiel-Gaarden der U Boote Bauart XB. (Description and operation instructions for Diesel motors on submarines of type XB). (Supplement ¢13 to PB 15477). 1941. 105 p. Price: Microfilm-$1.50 - Photostat- $7.00
This book was issued for the use of men in the services and deals with the type of Diesel motor installed in German XB submarines. It contains a full description of the motor and all its parts, their function and method of operation; service and maintenance instructions, and lists of spare parts carried on board; drawings and illustrations.

PB 15500. NOHR, KARL. Die Archaouleff-einspritzeinrichtung für Dieselmotoren (The Archaouleff injector for Diesel engines) (Supplement 18 to PB 15477) 1939. 8 p. Price: Microfilm-50¢ - Photostat-$1.00
Reprint from "MTZ-Motortechnische Zeitschrift", 4, 121, 1939, this paper discusses the forerunners of the Archaouleff fuel injection system, the fundamental idea of that system and its former application and present development.

PB 19396. SCHNEIDER, KURT. Entwicklung von rollenmeissel für hartes gebirge, Reichsforschungsrat (A new rotary chisel for cutting hard rock). (ALSOS Mission RFR 506 9) Dec 1944. 1 p. Price: Microfilm-50¢ - Photostat-$1.00
This document is a very brief report of a series of tests begun at the Reich Institute for Petroleum Research in Hanover, in January 1944, to determine the effect of drilling pressure, number of revolutions, solidity of the rock to be drilled, and the form of the tool used, on the efficacy of a new rotary chisel manufactured by Wirth and Co. for drilling hard rock. In German.

PB 19397. SCHULZ. Bohrturbine. Reichsforschungsrat (Drilling turbine) (ALSOS Mission, RFR 506 7) Dec 1944. 13 p. Price: Microfilm-50¢ - Photostat-$1.00
A short report by the Director of the Reichsinstitut für Erdölforschung (Reich Institute for petroleum research) connected with the School of Technology at Hanover. The report was ordered by the German Army and is dated Dec 13, 1944; it refers to the construction of a turbine drill, whose chisels are made of cast iron alloys. The project was to have been carried out by the plant of Wirth and Co, now located at Minden, Westphalia. This firm was very much interested in the project. Drawing of the machine is added.

PB 15480. SPECIFICATION of a 490 ft. cargo motorship for the N.V. Stoomvaart Maatschappij "Nederland". (Supplement #2 to PB 15477). (R.P. Mills, Shipbuilding Unit, TIIB, 3-46). 1937. 72 p. Price: Microfilm-$1.00 - Photostat-$5.00
This book contains detailed specifications on the engine and electric installations for a 490 ft. motorship built for the N.V. Stoomvaart Maatschappij "Netherland". Published in English at Amsterdam.

PB 15477. SPOFFORD, WILLIAM P. German marine Diesel engine practice. (CIOS Items 12 & 29, File XXX-31). 1945. 21 p. Price: Microfilm-50¢ - Photostat-$2.00
This is a composite picture, obtained from many interviews, opinions, designs, and actual engines, of Diesel marine engine practice in Germany. Personnel of the following firms were interviewed: Blohm & Voss; Maschinenfabrik Augsburg-Nürnberg A. G.; Krupp Germaniawerft; Howladtswerke; North German Lloyd; Hamburg American Line; and Demag. German practice on cycles, electric transmission, geared units, supercharging, cooling systems, gears, and basic materials used is outlined. The author has collected voluminous supplementary material consisting of diagrams, specifications, service instructions, technical papers, pamphlets, and machinery plans. For this material, see PB 15478 through PB 15507.

PB 15502. WOLF, OTTO. Aus dem Grossgetriebebau der Demag A.G. (The heavy gearing of the Demag). (Supplement 25a to PB 15477). 6 p. Price: Microfilm-50¢ - Photostat-$1.00
Reprint from "Demag Nachrichten", 1938, of an illustrated article describing the heavy gear mechanisms and drives manufactured by the Demag firm.

United States

PB 20218. ELMER, D. A. and others. Behavior of metals under dynamic conditions (MR-109): The design of a hydropneumatic machine for rapid load tensile testing. Progress report, Dec 23, 1944. (OSRD Rept 4774; NDRC Rept 18:41; War Metallurgy Committee Rept M-461). Feb 1945. 27 p. Price: Microfilm-50¢ - Photostat-$2.00
The design and operation of proposed equipment for studying the influence of rapid loading and time at load on the initiation of plastic deformation of metals in tension are described in the report prepared at the California Institute of Technology. The machine consists of a cylinder and piston actuated by a hydro-pneumatic system which would permit a load as high as 20,000 pounds to be applied to a specimen 0.500 inches in diameter in an interval of 0.005 sec. or more. This load or a smaller load could be maintained on the specimen for any desired length of time greater than 0.001 sec. The application of the data which could be obtained from tests with this equipment is discussed. It is estimated that the total cost of this machine would be about $3500.00. Drawings and schematic diagrams of this rapid load tensile testing equipment are included.

PB 22684. U. S. ENGINEER BOARD. Desert pioneer road set. (Rept 733). Jan 1943. 23 p. Price: Microfilm-50¢ - Photostat-$2.00
This report is a study of the type and number of pieces of road equipment, which should be available to a division operating in desert terrain, referred to in this report as a "Desert Pioneer Road Set", for the break through and maintenance of advance supply routes, in virgin desert terrain. (See Report 733 appendix A, PB 22685, for development, construction, and test of V type drags, road, desert, brush cutter). It was concluded from study, development and tests that road equipment set should consist of the following items: two tractors, crawler, medium w/bulldozers, each carried on a Transport, desert, medium tractor; - Two V drags, road, desert, brush cutter type each propelled by AD-7 crawler tractor or equivalent; - Two graders, road, motorized, high speed type - equipped with 13.00 x 24 tires all round to permit desert operation. Descriptions and photographs of this equipment are included in this report.

PB 19133. U. S. WAR DEPARTMENT. Combined operation and maintenance manual and parts list: Semi-trailer refrigerating unit. (Tech Manual 10-1614) Jul 1943. 80 p. Price: Microfilm-$1.00 - Photostat-$6.00
This refrigeration unit, together with low side cold plates, Thermal expansion valve and fittings inside the refrigerated compartment, contains all the elements necessary for the mechanical cooling of a truck trailer refrigeration van. The equipment embraces a York 2 5/8" x 2 1/2 " two cylinder, Freon 12, balanseal compressor driven by means of multiple V-belts from a four cylinder Y-69 continental gasoline engine. The low side consists of four plates containing a series of coils immersed in an eutectic solution. These plates are connected in two sets of two coils in series and the total of four fed by means of a thermal expansion valve. The system is controlled and temperatures maintained by a thermostat operating through a synchro-start control, which in turn starts and stops the gasoline engine. The unit may be operated manually. A more explicit description of the items comprising this control is given. The manual contains complete instructions for operation and maintenance of the various units, including photographs, sketches, illustrations, sectional views, exploded views, isometric drawings of the refrigerant piping, wiring, diagrams, and a complete parts list covering all units.

PB 22696. U. S. WAR DEPARTMENT. Crane, wheeled, gasoline, Mercer - "no. 3", on tractor, 1H, 1-4. (Tech Manual 10-1657). Mar 1946. 455 p. Price: Microfilm-$5.00 - Photostat-$31.00
This manual contains comprehensive information on the operation, maintenance, and repair of this tractor crane and its component parts. A gasoline engine delivers power to the rear weighted wheels for driving the vehicle. Through a power take-off, the engine also delivers power to a topping drum for operating the boom and to a hoisting drum for raising and lowering the load on the boom. The power supply engine is four cylinder, liquid cooled, valve-in-head, gasoline engine. Labeled photographs showing the unit and its parts, diagrams, parts assembly drawings and full parts lists are included.

PB 19134. U. S. WAR DEPARTMENT. Inspections and preventive maintenance services for domestic, reach-in, and walk-in refrigerators and miscellaneous refrigerating systems. (Tech Manual 5-671) Jun 1945. 18 p. Price: Microfilm-50¢ - Photostat-$2.00
This technical manual discusses command and technical inspection and first and second echelon preventive maintenance service of these refrigerators and refrigerating systems. It contains a guide for preventive maintenance, a chart of standard army lubricants, photographs of needed tools, a working sheet for inspection and service, and a record chart for inspection and service.

PB 22198. U. S. WAR DEPARTMENT. Laminating equipment PB-523/GF. (Tech Manual 11-2369). Oct 1944. 52 p. Price: Microfilm-$1.00 - Photostat-$4.00
This manual is concerned with laminating equipment which consists of two major components, the laminating press and a corner rounder. The press has been designed to fabricate identification cards between sheets of acetate and the corner rounder is used to cut 1/4-inch radius corners on the identification cards. Following the description instructions are given for installation, operation, and maintenance of the equipment. Photographs and drawings illustrate the manual. There is a maintenance parts list.

PB 19123. U. S. WAR DEPARTMENT. Maintenance manual for model 3-268A General Motors Diesel engines, ship's service generator sets, U. S. Army 176 ft. Diesel cargo vessels, design 381. (Tech Manual 55-1066) Nov 6, 1943. 146 p. Price: Microfilm-$1.50 - Photostat-$10.00
This is an instruction manual for this two-cycle diesel engine, used in 176 foot diesel cargo vessels. Installation, operation and maintenance instructions are given and the functioning of the component parts is described. Engine and operating data is tabulated, together with rat-

ings and clearances. A 100 kw auxiliary generator is directly connected with the engine. The engine is built under Army contract by the Cleveland Diesel Engine Division, General Motors Corporation. Numerous photographs, drawings, diagrams and plotted curves illustrate the instructions.

PB 19109. U. S. WAR DEPARTMENT. Operation and maintenance manual and parts list: Semitrailer, van type, refrigerator body; built by Hyde Corporation for U. S. Army; model KR-20. (Tech Manual 10-1313) Jul 1942. 33 p. Price: Microfilm-50¢ - Photostat-$3.00
This is a mobile refrigerating unit consisting essentially of a Waukesha truck type ice engine mounted on a trailer. This engine consists of a 13-15 horse-power gasoline engine, direct connected to a multivane refrigerant compressor, and controlled automatically by the temperature and demand for cooling of the refrigerated space. Detailed instructions are given for the operation and maintenance of the various parts of this assembly. Included also are photographs, drawings, and a parts lists.

PB 19113. U. S. WAR DEPARTMENT. Parts list and maintenance manual: Semi-trailer, 6-ton, van body, 2-wheel, 2DT, model T-8. (Tech Manual 10-1618) Dec 15, 1943. 190 p. Price: Microfilm-$2.00 - Photostat-$13.00
This semi-trailer, manufactured by Tiapte Brothers, Denver, Colorado, was designed to house a mobile textile repair and clothing repair unit. There are four corner jacks provided to level and steady the unit whenever it is operated as a portable workshop. There are six safety glass side windows and similar windows in the front and rear doors. A 25-gallon gasoline fuel tank is mounted on one side of the trailer to provide fuel for the 110-220 volt motor generator set which supplies power to operate the lights, machinery, and ventilating fan. Numerous electrical outlets are furnished, also a master control panel from which are controlled the circuits supplying 220 volt power to the wall power outlets. The body framework is of cold rolled steel, die formed into wing channel shapes, the covering material is of cold rolled and galvanized sheets, and the interior lining is of waterproof plywood. Detailed descriptions of the component parts, instructions for assembly and maintenance, driver's instructions, parts lists, photographs and drawings are included.

MEDICAL RESEARCH AND PRACTICE, INCLUDING CLINICAL APPLICATION OF DRUGS AND PHARMACEUTICALS

PB 15423. CHASIS, HERBERT. Phosgene: Review of the literature on the effect of exposure in man and experimental animals. Nov 1943 revised Apr 1944. 74 p. Price: Microfilm-$1.00 - Photostat-$5.00
The principle purpose of this review is to obtain specific information concerning the physiological disturbances in man so as to evaluate and recommend treatment of phosgene gassed patients. The symptomatology and clinical course of human phosgene intoxication are presented from data obtained in World War I and from 292 accidental poisonings reported since that time. The data obtained in man is kept separately from those obtained from the experimental animal. This work was done at New York University College of Medicine. Appendices cover casualty production and outline of therapy. There is a bibliography of 124 items.

PB 20877. ELDRIDGE, W. A. and others. Report on lethal concentration and pathology of mustard gas for dogs for 7½ minutes, 8 hours, 12 hours and 16 hours exposure. (Edgewood Arsenal Chemical Div Rept 98) Jan 1922. 14 p. Price: Microfilm-50¢ - Photostat-$1.00
This report describes work to determine the lethal concentration of mustard gas and study its pathological effects on dogs. The lethal concentration is defined as the least amount of gas in the gas-air mixture which will produce deaths of a majority (66-2/3%) of the dogs within 10 days after exposure to a given concentration over a definite period of time. The concentration is expressed in milligrams of compound per liter of air gas mixture. The lethal concentrations, clinical findings, and gross pathology are discussed and the results of exposures are tabulated. It was determined that mustard gas vapor acts chiefly as an ocular and respiratory irritant and that, in general, the longer the time of exposure or the higher the concentration, the more severe the effect on the eyes. Other physiological changes noted are summarized in the report.

PB 16788. HORNBERGER, W. and KÖNIG, H. Explosive decompression to simulated altitude up to 56,000 ft. Effect on man. Partial report I. (A translation from the German). Sep 1941. 23 p. Price: Microfilm-50¢ - Photostat-$2.00
The main purpose of the experiments was the determination of the "time reserve" available for rescue measures. It determines the speed with which a "rescue descent" must be started and carried out. A simulated altitude of 56,000 ft. was obtained and tolerated after sudden decompression of from 33,000-39,500 ft. with oxygen supply. Serious physical effects of rapid and sudden decompression did not occur under these conditions. The anticipated difficulties of stratosphere flight are further reduced. The time to the loss of consciousness due to low oxygen pressure is short. It was determined for different altitudes up to 55,500 ft. Two technical safety measures are required: (1) Oxygen breathing in flight zone, and (2) provisions for automatic rescue descent. Tables and a chart are attached to the report.

PB 19300. JOHANSSON, KARL R. and FERRIS, DEAN H. Photography of airborne particles during bacteriological plating operations. Sep - Nov 1942. 33 p. Price: Microfilm-50¢ - Photostat-$3.00
This report appears to be a copy of a manuscript prepared for publication in some journal in the bacteriological field. The danger in handling some of the highly infectious agents with commonly used laboratory methods is apparent as shown by this report. Tables appear in the report. Diagram and photographs are attached.

PB 16786. LUTZ, W. Preliminary report, decompression-atelectasis: Fundamentals, conditions of origin, influence on the possibilities of escape from high altitudes and protective measures.) n. d. 21 p. Price: Microfilm-50¢ - Photostat-$2.00
This document is a translation of a report from the Institute of Aviation Medicine in Munich, Germany. The changes of the lungs following decompression, obtained in simulated altitude flight, were studied by means of X-ray examinations. Mice and rabbits were the experimental animals. The experiments resulted in the following conclusions: (1) Total atelectasis is not reproducible with certainty. (2) Atelectasis develops at an altitude above 16,000 M (52,493 ft.). (3) Atelectasis is the more frequent and the more extended, the higher the altitude and the longer the duration of stay. (4) Its occurrence or non-occurrence is independent of intraabdominal pressure, of body temperature, and from the kind of respiratory gases. (5)Atelectasis can develop while the animal is still alive and can be counteracted in case of quick descent through the continuing of natural respiration. (6) It is evident that only the decompression protective suit which prevents the development of low pressure can be considered the ideal preventive and entirely suitable escape apparatus. Attached to the report are 10 X-ray photographs showing the development of decompression atelectasis and a chart on the release from atelectasis.

PB 6951. RANDALL, FRANCIS M and DAMON, ALBERT. Facial types among aviation cadets. (AAF ATSC Memo Rept EXP-M-49-695-15) Sep 1942. 13 p. Price: Microfilm - 50¢ - Photostat - $1.00
This report contains a chart showing frequency distribution of Nasion-Menton dimension (root of nose to base of chin) of 1453 subjects, measurements of the seven head types, facial index, and photographs of the seven type heads, all based on data presented in Memorandum Report No. EXP-M-695-

4B, entitled: "Facial surveys of aviation cadets and other flying personnel", dated August 31, 1942, and Memorandum Report No. EXP-M-49-695-4, entitled: "Anthropometric facial survey at Wilberforce University", dated July 7, 1942.

PB 16151. SAVELY, HARVEY E., JR. Visual disturbances following simulated ascent in the low-pressure chamber. (AAF ATSC Memo Rept Exp-M-49-696-1) Jul 1942. 16 p. Price: Microfilm-50¢ - Photostat-$2.00
The visual defects described as "blurring of vision" and "restriction of visual field" are effects produced by exposure to low pressure. They are probably manifestations of aeroembolism; however, the exact mechanism by which they are produced is not known. The appendices contain reports on the 14 cases of visual disturbances.

PB 5157. SPIERT, HAROLD. Salt and water requirements in hot weather. (AAF ATSC Memo Rept EXP-M-49-696-27) Nov 1942. 41 p. Price: Microfilm - 50¢ - Photostat - $3.00
The purpose of this report is to examine some recommendations embodied in report No. 13 from the Harvard Fatigue Laboratory, entitled "The requirements of water and Sodium Chloride for the best performance of men working in hot climates", in the light of certain recommendations of U. S. Army; to evaluate such recommendations on the basis of observations and experience at the Youngstown Sheet and Tube Company, Youngstown, Ohio; to estimate the water requirements of men in life rafts under emergency conditions at sea, and the average survival period without water at different seasons in various parts of the world. Experiments as conducted are described in detail in Appendix I. II, III, and IV. Plotted diagrams, graphs, and word maps showing number of days required for the average man to reach a water deficit of 10% of his body weight if he keeps shaded and remains quiet, are included.

PB 19301. U. S. AND CANADA. JOINT COMMISSION. WAR DISEASE CONTROL STATION, GROSSE ISLE, P. Q. Rinderpest, the preparation of tissues and egg vaccines. Feb 1944 - Jan 1946. 236 p. Price: Microfilm-$2.50 - Photostat-$16.00
This report contains sixteen typewritten papers describing the methods used and the results obtained in cultivating Rinderpest virus on the chorio-allantoic membrane of the developing hen's egg. Insofar as can be told from tests under experimental conditions, a vaccine was prepared which is satisfactory for use in protecting cattle against Rinderpest. Tables, charts, diagrams, graphs, and photographs are included.

PB 19096. U. S. WAR DEPARTMENT. MEDICAL CORPS. Medical Department soldier's handbook. (Tech Manual 8-220). 486 p. Price: Microfilm-$5.00 - Photostat-$33.00
This technical manual gives a complete scheme of instruction which covers the many phases of training of the Medical Department soldier.

PB 19094. U.S. WAR DEPARTMENT. MEDICAL CORPS. Physical reconditioning. (Tech Manual 8-292). 1944. 292 p. Price: Microfilm-$3.00 - Photostat-$19.00
This manual complete with instructions and diagramatic drawings is to accelerate the return to military duty of convalescent patients or to provide for their return to civilian life in the highest possible degree of physical fitness.

PB 20662. U. S. WAR DEPARTMENT. QUARTERMASTER BOARD. Report of test of underwear, insect proof (D D T) QMB T-1331. (Project T-274) Jan 1944. 7 p. Price: Microfilm-50¢ - Photostat-$1.00
Tests were made at Camp Lee, Virginia, to determine whether the wearing of insect-proof (D D T) underwear causes dermatitis, skin irritation or allergies. Tests in which men wore insect proof underwear and other men had patches of this insect proof underwear attached to their arms were made. Procedure is described in detail. It was concluded by medical officers who examined the men before and after the tests, that there was no significant difference in skin reactions of men wearing the insect proof underwear and those wearing the regular issue of underwear without insect proofing.

METALS AND METAL PRODUCTS

PB 22603. CRAIGHEAD, C. M. and GILLETT, H. W. Examination of enemy materiel (OD-113): Metallurgical examination of German and Japanese aluminum ware. Progress report 24, Nov 15, 1943. (OSRD Rept 3015; War Metallurgy Committee Rept M-184) Dec 1943. 26 p. Price: Microfilm-50¢ Photostat-$2.00
Twenty-one aluminum articles consisting of tent pins, mess kits, canteens, etc., of German and Japanese manufacture were examined to determine the alloys employed, the methods of production, the quality of the items, and the changes made over several years production. The German ware is of high quality and workmanship, and high purity aluminum has been extensively used to prevent corrosion. The alloys employed appear to be standardized and only minor changes in materials were observed. The Japanese ware is of inferior quality and workmanship, and either a disregard for corrosion, or a lack of aluminum of suitable purity has governed the selection of the aluminum alloys. The use of oxide films, produced by anodic oxidation, to inhibit corrosion was observed on several canteens of more recent production. Photographs and tables giving results of chemical analyses are included.

PB 22006. GRENELL, L. H. and others. Examination of enemy materiel (OD-113)(AC-77)(M-119): Metallurgical examination of small arms barrels. Progress report 177, Apr 23, 1945. (OSRD Rept 5229; War Metallurgy Committee Rept M-548) Jun 1945. 9 p. Price: Microfilm-50¢ - Photostat-$1.00
German practice in the manufacture of small arms barrels consisted of thorough hammer forging and machining, although prior to 1939 bar stock blanks upset on the ends only were used. In all cases, the lands and grooves were machined by broaching. Barrels under 13 mm. in size were made from medium-carbon steel similar to SAE 1065, which was heat treated by normalizing to a hardness of 280 Vickers. Barrels larger than 13 mm were made fro Ni-Cr or Cr steels which were heat treated by quenching and tempering to VDH of 270. The examination of Japanese barrels indicated the use of hammer forging in their manufacture, although one barrel examined was machined from bar stock. All Japanese barrels were rifled rather than broached. The use of high-alloy steels containing 2 percent tungsten or 3.2 percent nickel and 1.3 percent chromium with 0.4 percent molybdenum is common Japanese practice. These steels were heat treated by quenching and tempering to a VDH of 300 to 340. Detailed information on fifteen German and five Japanese small arms barrels is given in table 1. These data included method of rifling, markings, type of material, hardness, and heat treatment. Table 2 gives chemical analyses of small arms barrel steels. Photographs are included.

PB 22005. GRENELL, L. H. and others. Examination of enemy materiel (OD-113)(AC-77)(M-119): Metallurgical examination of tungsten carbide powder and compacts. Progress report 187, May 1, 1945. (OSRD Rept 5230; War Metallurgy Committee Rept M-547) Jun 1945. 6 p. Price: Microfilm-50¢ - Photostat-$1.00
The powder and octagonal compact appeared to be normal tungsten carbide materials. The compact was probably formed by a cold-pressing and sintering operation. A fine grain size, fairly heavy porosity, and low density suggested a fine particle size of the powder with a relatively short sintering period. The density of the compact was lower than similar U. S. alloys and would be considered inferior. Carbides of this type find application in the machining of hard wood, bronze, and iron. The tool bit was compacted from a tungsten carbide-titanium carbide powder with no apparent unusual properties. With the exception of a lower cobalt content, the tool bit closely approximated similar U. S. alloys in composition and properties. Tools of this type are used for

the high-speed machining of steel. Chemical analyses will be found in Table 1, and comparison of the tool bit and octagonal rod with United States alloys of similar composition in Table 2. Micrographs of the tool bit and octagonal compact are included. No information as to nationality, date or place of manufacture of the carbide was supplied.

Czechoslovakian

OSRD 3846

PB 21858. GRENELL, L. H. and others. Examination of enemy materiel: Metallurgical examination of Czechoslovakian tank armor plate. Progress report 75, Jun 1944. 7 p. Price: Microfilm - 50¢ - Photostat - $1.00
Four pieces of tank plate, two of them two inches thick and two being 5/8 inch thick were examined at the Battelle Memorial Institute. The 5/8-inch thick plates were cross-rolled from Cr-Mn-Si steel ingots, and the 2-inch thick plates from Cr-Mo and Cr-Mn-MO ingots. These steels were produced in either basic open-hearth or electric furnaces and were deoxidized with silicon. Aluminum and titanium were used for grain refinement in the Cr-Mo steel, and aluminum, titanium, and vanadium in the other three plates. All of the steels were fine grained. Information regarding the macrostructure and inclusions, physical properties, and heat treatment is included. Photomicrographs and tables of data are presented.

German

PB 19689. COMSTOCK, GREGORY J. and others. Report of combined J.I.O.A. and B.I.O.S. powder metallurgy trip no. 1466. 1945. 271 p. Price: Microfilm - $3.00 Photostat - $19.00
This report reviews the field of powdered metallurgy as carried on in Germany. The information contained in the report was obtained by British and American investigators traveling to the various plants and interrogating men responsible for progress in the powdered metals field. Contained in this document is a treatment of the following: High temperature research by Krupp's metallkeramik department gleaned from an interview with Dr. Stabeline of the Krupp-Widia Research staff regarding high temperature ceramic and metal turbine blading; methods of manufacture of sintered hard cemented carbide; development of tungsten-free and tungsten-poor hard cemented carbides; manufacture of pressure-sintered copper or iron graphite bearings; Deutsche Pulvermetallurgische Gesellschaft m.b.H. (Production of metal powders, patent structure, fabrication of metal parts); list of German firms and individuals interested in powder metallurgy; a report containing a photostatic copy of a metal powder die and description of its performance; a copy of a Hescho booklet with a detailed description and diagrams of the construction of the No. 5 Hescho automatic press (mechanical); iron-aluminum alloy resistance wires. Included also are two reports in German: Deutsche Luftfahrtforschung, Geheim, E.4. Untersuchungen und Mitteilungen No. 785, Keramische Werkstoffe für Hochtemperaturbeanspruchte Maschinenteile (German Aeronautical Research, Secret, E.4. Investigation and Information No. 785 Ceramic Material for Machine Parts Required for High Temperatures) and Deutsche Luftfahrtforschung, Geheim, E.21. Forschungsbericht No. 1370, Über die Zünderbeständigkeit von binären und ternären Legierungen von Chrom, Nickel, Tantal, Niob, Wolfram und Molybdän. (German Aeronautical Research, Secret E. 21, Research Report No. 1370, on the scaling resistance of binary and tertiary alloys of chromium, nickel, tantalum, columbium, tungsten and molybdenum.)

PB 14711. FISCHER, W. A. and HEYES, J. Umsetzungen von phosphorhaltigen legierungen mit erdalkalimetallen und erzeugung von eisenpulver (Dephosphorization of iron alloys by alkali earth metals and manufacture of iron powder). (Kaiser Wilhelm Institut für Eisenforschung) (ALSOS Mission, Hoyt File 95) May 1945. 2 p. Price: Microfilm-50¢ - Photostat-$1.00
This paper describes a process in which phosphorus containing iron is heated with magnesia at temperatures ranging from 500° to 1100° C and the resulting magnesium phosphide boiled out with water, and thus from 90% to 95% of phosphorus removed. After separation of the magnesium oxide the iron was to be used for manufacture of powder for sintering.

PB 21880. GRENELL, L. H. Examination of enemy materiel: Metallurgical examination of German 50 mm A.P.C. - H.E. rounds with long and short cartridge cases. Progress report 54, Apr 7, 1944. (OSRD Rept 3636) May 1944. 29 p. Price: Microfilm-50¢ - Photostat-$2.00
The steels in these rounds were produced in basic open-hearth or basic electric furnaces. Most of the steels in the 1942 round were deoxidized with titanium or a combination of titanium and aluminum; the 1940 fuse body and the 1941 projectile nose steels with titanium; and the other steels in the 1940 and 1941 rounds with aluminum or silicon. The changes in components during these years are tabulated. The projectiles were fabricated by buttwelding noses to bases, differentially heating and uniformly oil quenching these assemblies, and attaching heat-treated caps to the noses. The heat treatment of the caps consisted of oil quenching from within the critical ranges of the respective steels and tempering to produce microstructures of ferrite and tempered martensite. The caps were soldered to the noses with lead-tin-antimony alloys. The rotating bands were manufactured from powdered iron. The 1942 rotating band was unusually low in manganese and high in vanadium, aluminum, and titanium. The 1940 and 1941 projectiles were covered with paint coatings consisting of alkyd resin top coats and primers. The 1942 projectile had a thin coat of paint without a primer. Numerous parts of the cartridge case primer, fuse primer, and tracer assemblies were fabricated from steel, brasses, and duralumin. Tables, drawings, photographs and diagrams of hardness surveys are also included.

PB 21885. GRENELL, L. H. and others. Examination of enemy materiel: Metallurgical examination of a German aircraft torpedo and warhead. Progress report 215, Aug 18, 1945. (OSRD Rept 5717) Sep 1945. 18 p.
Price: Microfilm-50¢ - Photostat-$2.00
The German aircraft torpedo was manufactured from bronze, brass, copper, and alloy and plain-carbon steel. Two types of bronze were noted: Phosphor bronze in castings and springs, and manganese bronze in parts subjected to wear. The castings were sound, with very little pinhole porosity; the bronze castings contained normal amounts of microporosity. Casting finish and design were good. Brass parts included alpha and Muntz metal (60-40 Cu-Zn) types and some leaded brasses. All tubing was seamless copper. Five types of alloy steel were noted: Low-carbon, 1 percent manganese steel; low-carbon, 13/17 percent chromium steel; low-carbon, 20/25 percent nickel steel; SAE 4140 type; and SAE 52100 type. The steels used in the remainder of the parts were low- and medium-plain-carbon types. Physical properties of the low-carbon, 1 percent manganese steel were normal. All of the alloy steels were heat treated. Several parts were carburized to depths ranging from 0.04 to 0.06 inch. The carburizing and subsequent heat-treating techniques were good. Welding was used to assemble the smaller tanks and in producing some of the inner frames and partitions of the torpedo body. Workmanship followed the usual high German standards. Machining was good and was carried out to close tolerances where necessary. Attached parts were either bolted or soldered, and all small oil, gasoline and air lines were soldered in place. A comparison of German aircraft torpedo with Japanese type described in OSRD Report 4593 is presented. Photographs and tables of data are included. This investigation was made at Battelle Memorial Institute.

PB 21882. GRENELL, L. H. and others. Examination of enemy materiel: Metallurgical examination of a German M.G. 34 anti-aircraft tripod. Progress report 218, Aug 18, 1945. (OSRD Rept 5727) Sep 1945. 7 p.
Price: Microfilm-50¢ - Photostat-$1.00
With the exception of the assembly pins which were cut from cold-drawn aluminum alloy rod, about one-half of the tripod components were fabricated from a magnesium alloy, and the other half from steel. Magnesium parts were forged or cut

from Downetal-J or AM-C57S type alloy and annealed. Ferrous parts, three of which were assembled by brazing or welding, were forged, stamped, or machined from plain low-carbon steel. The steel leg gears were heat treated by cyaniding selected surfaces, while the leg gear racks were heat treated by cyaniding on all surfaces. All other steel parts were unheat-treated. Views of the tripod as received and disassembled are shown in photographs. Detailed data on each component and spectrographic analyses of selected parts are tabulated. This investigation of tripod for the M.G. 34 machine gun was made at the Battelle Memorial Institute.

PB 21876. GRENELL, L. H. and others. Examination of enemy materiel: Metallurgical examination of four German duplex welded 37 mm A.P. rounds and three German 37 mm A.P. H. E. projectiles. Progress report 56, Apr 14, 1944. (OSRD Rept 3665; War Metallurgy Committee Rept M-284) May 1944. 17 p. Price: Microfilm-50¢ - Photostat-$2.00

The four German A.P. duplex-welded rounds, although of the same caliber and type, show some differences in manufacture. Both pair of rounds appear to be resistance butt or flash welded, with one pair showing a greater amount of upset on deep macroetching. All of the rounds had the same nose hardness, 836 average VHN, but the rounds with the greater amount of upset had a hardness of 792 average VHN at the weld line as compared to 723 average VHN for the remaining two rounds. The VHN of 792 was at least 100 VHN's higher than the readings above or below it, while the VHN of 723 was approximately the same as its adjacent readings. The results of the hardness surveys coupled with the differences in the microstructures suggest heat treatment before welding on the rounds of high weld line hardness and heat treatment after welding on the remaining two rounds, but the absence of a heat-affected zone indicates heat treatment after welding for all. The exact sequence of operations is not clear. The three German solid A.P. H.E. projectiles were machined from medium carbon nickel-chromium steels, and were fitted with electrolytic copper driving bands pressed into place. The welded projectiles had a phosphate coating and the solid projectiles a black paint cover for corrosion protection. The chemical and spectrographic analyses are given in Table 1 in the appendix, and photographs, micrographs and hardness surveys accompany the report.

PB 22372. GRENELL, L. H. and others. Examination of enemy materiel (OD-113; AC-77): Metallurgical examination of six German explosive bomb rack bolts. Progress report 125, Sep 13, 1944. (OSRD Rept 4317) Nov 1944. 10 p. Price: Microfilm-50¢ - Photostat-$1.00

This report, from the Battelle Memorial Institute, covers the examination of 6 German explosive bolts for a bomb rack, to determine the type of materials, method of manufacture and use of these bolts. The function of the bolts was to release the bomb rack from the airplane on detonation. They were machined from 0.30% carbon Cr-Mo-V alloy steel, and were oil quenched and subsequently tempered. There were 4 sizes and styles among the 6 bolts according to their use. Photographs and drawings of the different bolts are followed by a table of hardness, chemical and spectrographic analysis of the German explosive bolts.

PB 21993. GRENELL, L. H. and others. Examination of enemy materiel (OD-113; AC-77; M-119): Metallurgical examination of a German Panther, Mark V, tank engine. Progress report 198, Jul 23, 1945. (OSRD Rept 5504) Aug 1945. 22 p. Price: Microfilm-50¢ - Photostat-$2.00

The Panther tank engine was fabricated predominantly from gray iron and low-carbon steel with a few parts from alloy steels, aluminum alloys, bronze and babbitt bearing metals, and zinc-base alloys. Workmanship was good throughout the engine. The castings were sound, forging lines followed part shapes, and machining was held to close tolerances where necessary. Specific part information such as type of material, fabrication, and heat treatment is listed in Table 1, chemical analyses of some of the ferrous and nonferrous parts in Tables 2 and 3, and data on physical properties of crankshaft and connecting rod in Table 4. Photographs are included.

PB 21985. GRENELL, L. H. and others. Examination of enemy materiel (OD-113)(AC-77)(M-119): Metallurgical examination of German "Panther" (Mark V) tank parts. Progress report 203, Aug 8, 1945. (OSRD Rept 5712; War Metallurgy Committee Rept M-590) Sep 1945. 24 p. Price: Microfilm-50¢ - Photostat-$2.00

The transmission unit, torsion bar, bogie wheel, and drive sprocket from a German tank examined were manufactured from plain carbon and alloy steels, and gray iron. The torsion bar, forged from SAE 6160-type steel with boron, is the first instance of the use by the German of a boron-treated steel. Except for this, standard manufacturing methods and conventional materials were used. General data on the parts examined are listed in Table 1; analyses are given in Table 2; and physical properties of torsion bar in Table 3. Photographs, schematic diagram, hardness surveys, and Jominy hardenability curves of torsion bars, are included.

PB 22693. HENDERSON, A. S. and others. Examination of enemy materiel: A metallurgical examination of two German 8.8 cm. high-explosive shells. Progress report 13, Jul 20, 1943. (OSRD Rept 1715; War Metallurgy Committee Rept M-122) Aug 1943. 43 p. Price: Microfilm-50¢ - Photostat-$3.00

This German ammunition, probably manufactured in the fall of 1942, is of good workmanship. The armor-piercing round utilizes alloying metals normally considered critically scarce; however, alloy steels have not been used where they are not heat-treated. The heat treatment of the armor-piercing round is excellent except for a possible need of stress relief, as indicated by cracking of the sectioned projectile body. The high-explosive shell case is not heat-treated. The use of war-impregnated, powdered-iron rotating bands for copper or bimetal strip is the only material substitution that has been made. The conventional 70-30 copper-zinc brass is used in these long cartridge cases, in spite of the substitution of steel for the cartridge case material in some other types of ammunition. The nose cap of the armor-piercing shell is joined to the shell body with a high-tin lead solder. The use of very high tin (over 58%) is, doubtless, to avoid softening of the shell body. These projectiles indicate a lack of copper, but no great lack of vanadium or tin. Seam welding is used to join the windshield to the nose cap, but here a change in hardness should not materially affect the ballistic properties. This seam weld is both brittle and porous, indicating the disregard of physical properties in this part of the shell. Tables and photographs are included.

PB 22695. HENDERSON, A. S. and others. Examination of enemy materiel (OD-113): A metallurgical examination of a duplex, welded, 75 mm. German A.P.-H.E.-C.-B.C. projectile and a 75 mm. German H.E. projectile manufactured 1942. Progress report 15, Aug 16, 1943. (OSRD Rept 1782; War Metallurgy Committee Rept M-135) Sep 1943. 26 p. Price: Microfilm-50¢ - Photostat-$2.00

Of interest was the 75 mm. armor-piercing projectile (FMAM-289) in which special design, fabrication, and materials were employed to produce specific results. Two sections, medium carbon (1.56% Cr) rolled stock, and high carbon (1.47% Cr) forged steel, were joined at the bourrelet with a butt weld to produce the projectile. The forged high-carbon cap was flame hardened at the tip to give an initial "bite" into the armor, and was secured to the projectile body with a 60 Sn-40 Pb solder. Softening of the cap was avoided, along with possible improvement of economic and productive practice, by pressing the W.D. 1010 windshield to the cap in place of the previous arc-welding method. The high explosive projectile (FMAM-328) is a W.D. 1070 steel forging. The driving band consisted of a low-carbon powdered-iron, wax-impregnated compact which had been coined into place. While the driving band of the armor-piercing projectile (FMAM 289) is similar in composition to the high-explosive one (FMAM-328), the knurl design differs with the type of projectile. Tables, photographs and dimensional drawings are included.

PB 22694. HENDERSON, A. S. and others. Examination of enemy materiel (OD-113): Metallurgical and chemical examination of German 7.9 mm. cartridge link belts. Progress report 14. (OSRD Rept 1753) Aug 1943. 10 p. Price: Microfilm-50¢ - Photostat-$1.00

Subject samples are of conventional manufacture and workmanship. The care used in preventing atmospheric corrosion of the parts, which consists of using a phosphate bonderized coating on the clips and a stainless alloy wire for the connecting links, indicates the intention of storing ammunition in the belts for some time before its use and, possibly, of using the belts for reloading. The fact that a harder steel with higher carbon and manganese contents was used in making the disintegrating type of belt is an indication of the German thorough attention to details in selecting the best type of steel available for a particular use. The use of stainless alloy wire containing 18 percent manganese and nearly 10 percent chromium is novel, and indicates the ability of German metallurgists to find substitutes for the conventional stainless steels. Photographs and tables are included.

PB 19271. MANNOX, F. C. AND MILLER, H. J. Copper smelting and refining, particularly from alloy scrap and residues, at Zinnwerke Wilhelmsberg G.m.b.H., Hamburg-Wilhelmsberg 1. (BIOS Final Rept 25, Item 21) Jul, Aug 1945. 23 p. Price: Microfilm-50¢ - Photostat-$2.00
This plant is concerned essentially with the treatment of copper bearing scrap and residues and a recovery is made of the copper, tin, lead, zinc and nickel contents in the form of: (a) cathode copper, (b) tin-lead solders and white metal alloys, (c) zinc oxide, (d) nickel sulphate. The report describes the method of segregating and treating the different types of scrap as: copper-zinc-tin-lead scrap, copper-zinc scrap, impure copper scrap, and high quality copper scrap. Flow sheets show the routing of these scraps through the plant. In addition high content metallic slag is further re-routed through the furnaces for additional extraction of metals. The operations of the blast furnaces, converters and electric extractors are discussed. The metallurgical process is good and this plant obtains a better recovery of constituent metals from bronze and brass scrap than can be obtained by any other established method.

PB 19677. MANNOX, F. C. and MILLER, H. J. Copper smelting and refining, together with related metallurgical activities at Nord Deutsche Affinerie (i.e., Norddeutsche Raffinerie), Hamburg. (BIOS Final Rept 26, Item 21). Jul, Aug 1945. 20 p. Price: Microfilm-50¢ - Photostat-$2.00
This plant works copper, lead nickel, and other metals. The plant uses cyprus and Finnish copper ores assaying 20-25% copper and 30-35% sulphur. These ores are roasted in hearth roaster furnaces, and the gases are collected and led to Cottrell precipitators, cleaned, washed and led to the sulphuric acid plant. The report describes also other phases of copper production, including anode castings, refined copper castings and copper powder production. The smelters, blast furnaces, and copper tank house are also described as are the treatment of other ores or metals, including the production of nickel, zinc oxide, lead, bismuth, and the precious metals. Pavings bricks are made of the slag at this plant. A diagram of cells in the copper tank house is shown.

PB 19676. STUBBS, R. L. and others. Extruding and rolling of zinc alloys. (BIOS Evaluation Rept 393). Feb 1946. 4 p. Price: Microfilm-50¢ - Photostat-$1.00
Four targets in Germany were visited. (a) Hueck & Roepke at Ludenscheid roll the strip and Hueck & Buren, across the street, roll the strip into foil; they use only zinc 99.99% pure. Formerly they rolled aluminum but were forced to switch to zinc. They anticipated no great demand for zinc foil after the war. (b) Vereinigte Deutsche Metallwerke A.G., at Werdohl i.W., prior to the war rolled and extruded copper, brass and aluminum but shortages also compelled them to use zinc. The chief zinc alloys used were Z010 (plus Mn) and Z410. These were both rolled to strip for deep drawing. (c) Sundwiger Messingwerk at Sundwig i.". company produced tubes of copper, brass, aluminum and zinc and also produced sheet strip and wire. They had commenced rolling zinc in 1939. They used three alloys Z010 with Mn, Z410 and Z100. (d) Messingwerk Unna A.G. This plant produced rods, tubes and strip in brass, copper, aluminum and zinc on a large scale. It commenced using zinc in Feb. 1940. It uses three zinc alloys only: Z400, Z010 plus Mn and Z040 Pb. Certain equipment at the four targets were of interest to the investigators, but they were not described in this report.

PB 21829. TOUR, SAM. Dr. Ing. Kurt Laue and wife, Wutöschingen/Baden. (FIAT Final Rept 70) Sep 1945. 8 p. Price: Microfilm - 50¢ - Photostat - $1.00
This report is largely concerned with Dr. Laue, a metallurgical engineer who has been very active in the fields of hot working of metals and cold drawing of metals. Dr. Laue has been working on a book called "Tools for Metal Extrusion", about two thirds of which was already in galley proof at the time this interview was conducted, Dr. Laue was busy completing the remaining third of the volume. Chapter headings for this part as well as subjects to be treated in a second volume on "Drawing of metals" are listed. A personal history statement concerning Dr. Laue is appended to the document. The personal history is a very poor copy. The report itself will not reproduce too well.

Japanese

PB 21883. BARTHOLOMEW, E. L., JR. and others. Examination of enemy materiel: Metallurgical investigation of a Japanese 15 cm howitzer. Progress report 217, Aug 31, 1945. (OSRD Rept 6010) Sep 1945. 30 p.
Price: Microfilm-50¢ - Photostat-$2.00
This report was prepared by Massachusetts Institute of Technology under NDRC contract. An examination of tube, sleeve, locking collar, holding band, and breech block of a Japanese 15 cm howitzer No. 175 dated 1922 was conducted to determine metallurgical and mechanical properties, chemical analysis, and method of manufacture. All gun components have been subjected to hot working. They were made from a low carbon, high nickel type analysis. Considering this analysis the tube and sleeve possess low impact strength. All parts were air cooled and tempered. Photographs, drawings and graphs and tables of data are included.

PB 21884. BARTHOLOMEW, E. L., JR., and others. Examination of enemy materiel: Metallurgical investigation of Japanese 81 mm mortars. Progress report 216, Aug 31, 1945. (OSRD Rept 6009) Sep 1945. 17 p. Price: Microfilm-50¢ - Photostat-$2.00
This report was prepared by Massachusetts Institute of Technology under NDRC contract. Each part of the following Japanese 81 mm mortars was examined for type and quality of materials, method of manufacture and heat treatment: 1. Japanese, model 3, 81 mm mortar No. 10 (FMAR-530A); 2. Japanese 81 mm mortar, type 99, No. 868 (FMAR-192A). Although both mortars were manufactured in 1943, type 99, the newer design, utilized hardened and tempered alloy steels and in some instances differential hardening. Model 3 consisted primarily of slowly cooled plain carbon steels. A majority of the parts examined were machined from bar stock. Photographs and tables are included.

PB 21852. GRENELL, L. H. and others. Examination of enemy materiel: Metallurgical examination of a Japanese C/R 20 mm Hotchkiss H.E. shell for model 98 A.A. gun. Progress report 211, Aug 13, 1945. (OSRD Rept 5715) Sep 1945. 8 p. Price: Microfilm - 50¢ - Photostat - $1.00
Investigation at the Battelle Memorial Institute showed that the shell body was machined from steel bar stock similar to SAE 1080, and was heat treated by quenching and tempering to a VDH of 301. The fuze body and primer were machined from 60-40 brass in the as-cast condition. The rotating band was commercial copper seamless tubing. The cartridge case was deep drawn from 60-40 brass and was mouth annealed. The presence of high residual Sn and Cu in the projectile steel probably resulted from the large proportion of scrap in the furnace charge. The use of 60-40 brass, considered unsuitable for deep drawing in this country, in the manufacture of the shell case is consistent with traditional oriental experience with high-zinc brasses. Photographs of the shell and tabulated information regarding manufacture and metallurgical analysis are included.

PB 21871. GRENELL, L. H. and others. Examination of enemy materiel: Metallurgical examination of a Japanese 1/3 KG anti-parked aircraft bomb. Progress report 63, May 9, 1944. (OSRD Rept 3814) Jun 1944. 7 p.
Price: Microfilm-50¢ - Photostat-$1.00

All of the ferrous components of this bomb were found upon examination at Battelle Memorial Institute to be manufactured from plain carbon steels. The baffle, body, and firing pin were machined from medium carbon steel bars and the coupling and cone of the tail assembly from duralumin bars. A low carbon steel stamped cup was soldered to the small end of the baffle. The cap was stamped from low carbon steel sheet and attached inside the body of soldering. Five pieces of duralumin sheet were bent and fastened together as well as to a hexagon-shaped duralumin sheet base with duralumin rivets to form the fin assembly, which was attached to the tail cone with low carbon steel screws. The methods used in manufacturing this bomb were uneconomical of man-hours and in some cases also of material. Discussions of economic considerations and results of the examination, photographs and tabulated data on components are included.

PB 21878. GRENELL, L. H. and others. Examination of enemy materiel: Metallurgical examination of a Japanese 7.7 mm model 92 heavy machine gun of 1938. Progress report 57, Apr 15, 1944. (OSRD Rept 3643) May 1944. 14 p. Price: Microfilm-50¢ - Photostat-$1.00

The majority of the metal parts used in the manufacture of the model 92, Japanese, 7.7 mm. heavy machine gun were made of unalloyed steel. The only exceptions were a few parts found to contain tungsten in amounts over 1.4 percent. Two parts had chromium in percentages slightly higher than residual amounts commonly encountered in the United States, but not high enough to represent intentional use of this alloy. Scrap formed a considerable part of the furnace charges, and, with few exceptions, silicon-killed steels were employed. A minor number of small parts were made from high sulphur screw stock. The high tungsten steels, carrying about 0.70 percent carbon, appear to have been made in electric furnaces, while the rest are principally of basic open-hearth manufacture. Fabricating methods are similar to those used in this country. Tables give details of manufacture, analyses of selected parts and data from American handbook on Japanese military forces TM30-480 covering 7.7 mm (1932) heavy machine gun. Photographs are included.

PB 22317. GRENELL, L. H. and others. Examination of enemy materiel: Metallurgical examination of armor plate from Japanese aircraft "Betty". Progress report 157, Jan 19, 1945. (OSRD Rept 4776) Mar 1945. 5 p. Price: Microfilm-50¢ - Photostat-$1.00

This report covers the examination of a section of armor plate from a Japanese aircraft "Betty" for chemical composition and physical properties. The armor plate was homogeneous and was cross-rolled from medium C,Mn-Ni-Cr-Mo steel, which was produced in a basic open-hearth furnace, and was clean. The steel was quenched and tempered to a hardness of 592 Brinell. The tensile properties were normal, and the Charpy impact results were good for this material at this hardness level. A photograph and a table giving detailed data on the armor plate are included. This investigation was carried out at Battelle Memorial Institute.

PB 22323. GRENELL, L. H. and others. Examination of enemy materiel: Metallurgical examination of armor plate from Japanese aircraft "Lily 2"; Progress report 160, Feb 28, 1945. (OSRD Rept 4914) Apr 1945. 7 p. Price: Microfilm-50¢ - Photostat-$1.00

The armor plate examined was a pilot back plate manufactured by flame cutting and bending cross rolled SAE X-4130 type steel, which was face hardened by carburizing to a depth of 0.050 inch. The steel was produced in a basic open hearth furnace and was fine grained and clean. The plate was quenched and tempered to average case and core hardnesses of 808 and 541 Vickers, respectively. This face-hardened armor plate was less highly alloyed, had higher case and core hardnesses, and a much thinner case than comparable plate used by the U. S. Navy. The case was about 8 per cent of the plate thickness as compared with 20 per cent as used in this country. Discussion of results of the examination, photographs, microphotographs, and tabulated data are included in this report which was prepared at Battelle Memorial Institute.

PB 21860. GRENELL, L. H. and others. Examination of enemy materiel: Metallurgical examination of four Japanese 50 mm grenades and six fuses. Progress report 76, Jun 3, 1944. (OSRD Rept 3895) Jul 1944. 13 p. Price: Microfilm - 50¢ - Photostat - $1.00

This report covers the examination of four Japanese grenades (1938-1941) for the 50 mm. discharger and six fuses (Type 88) for these grenades (1934-1941). In general, although the fuse and grenade assemblies were interchangeable the parts were not. Many parts showed evidence of hand fitting. Many of the hollow parts were machined from solid bar stock, perhaps on a lathe, rather than by forging or stamping. The most noticeable development was the introduction in 1940 of a strongly adherent varnish for the outer coating to replace the hard, brittle, glossy-black bituminous coating used in 1938 and 1939. That used in 1940 had an alkyd resin vehicle, and that used in 1941 had an oleoresinous vehicle. Economically, the most important observation may be the noninterchangability of individual parts since assembly of such units must consume much time. Another indication of the state of Japanese industry was the restricted use of forming processes which require massive machines and highly-skilled diemakers. Photographs, and tabulated data are included. This report was prepared at Battelle Memorial Institute.

PB 21867. GRENELL, L. H. and others. Examination of enemy materiel: Metallurgical examination of Japanese 25 mm Hotchkiss incendiary and H.E., incendiary tracer rounds. Progress report 68, May 15, 1944. (OSRD Rept 3844) Jul 1944. 19 p. Price: Microfilm-50¢ - Photostat-$2.00

Examination made at the Battelle Memorial Institute revealed that the steels used in the projectile bodies of all the rounds were produced in basic open-hearth furnaces. The high residual tin in all the projectile bodies indicated that scrap metal made up considerable portions of the furnace charges. All of the bodies were machined from WD 1055 bar stock which was partially spheroidized in the incendiary rounds and as rolled in the H. E. incendiary, tracer rounds. The bourrelets and rotating bands were fabricated from gilding metal strip. The cartridge cases were deep drawn from 70-30 brasses and had normal characteristics for this material. There were no significant differences in material, method of manufacture, or heat treatment used in the 1942 and 1943 rounds. Discussion of economic considerations and findings in the investigation, photographs, and tabulated data are included.

PB 21853. GRENELL, L. H. and others. Examination of enemy materiel: Metallurgical examination of Japanese .30 caliber and .50 caliber disintegrating cartridge link belts. Progress report 83, Jun 14, 1944. (OSRD Rept 3919) Jul 1944. 6 p. Price: Microfilm - 50¢ - Photostat - $1.00

Investigation at the Battelle Memorial Institute showed that these cartridge link belts were made of high carbon steel which had been silicon-killed. X-ray analysis showed the protective coatings consisted of iron oxide. These coatings failed rapidly when subjected to a humidity test. Each set of links was of conventional design and workmanship. The usual Japanese high residual copper and tin from use of miscellaneous scrap was present. Photographs and tables showing weight, hardness, microstructure, and chemical and spectrographic analysis are included.

PB 21861. GRENELL, D. H. and others. Examination of enemy materiel: Metallurgical examination of Japanese 37 mm high explosive shells. Progress report 77, Jun 7, 1944. (OSRD Rept 3896) Jul 1944. 7 p. Price: Microfilm-50¢ - Photostat-$1.00

This report prepared at Battelle Memorial Institute covers the examination of three inert Japanese 37 mm. high explosive rounds which were identical in date of manufacture and design. The ferrous parts of these shells were made from basic open hearth steels which had been silicon killed. The cartridge case was drawn from 68-32 brass while the fuse body was 60-40 brass. Several parts of the fuse assembly were made from bronze, duralumin, and nickel coated brass.

The protective coatings were of inferior quality being easily removed by abrasion. The fuze parts and adapters were interchangeable in all three rounds, indicating standardization of procedure in design and manufacture. The usual high residual Cu and Sn from scrap in the melting charge appear in the steel of the projectile. No attempt was made to conserve copper or copper alloys by substitution of less critical material. Photograph included.

PB 21855. GRENELL, L. H. and others. Examination of enemy materiel: Metallurgical examination of Japanese 63 kilogram bombs, fuzes, and gaines. Progress report 62, May 8, 1944. (OSRD Rept 3839) Jun 1944. 20 p. Price: Microfilm - 50¢ - Photostat - $2.00

The three Japanese bombs examined were of the semi-armor piercing and general purpose type. The general purpose bombs were reported to have been widely and successfully used by the Japanese. The semi-armor-piercing bomb was forged from SAE-3140 steel. The general purpose bombs were of two different types: One with a cast WD-1030 nose, the other with a forged WD-1020 nose. Both noses were riveted and welded to WD-1015 seamless tubing. The cast nose showed poor deoxidation practice and did not meet Navy specifications, but the properties are presumably adequate. The physical tests were normal, except for the cast nose. The two bomb fuzes and two gaines examined were, for the most part, machined from manganese bronze. The fuzes were lacquered externally, and the gaines were tin-coated inside and out. Included in this report are discussion of the economic considerations and findings, photographs, and tables showing chemical and spectrographic analyses of the ferrous alloys used, physical properties of the bombs, and part list for the fuses and gaines.

PB 21859. GRENELL, L. H. and others. Examination of enemy materiel: Metallurgical examination of Japanese 70 mm and 75 mm H.E. ammunition. Progress report 74, May 31, 1944. (OSRD Rept 3894) Jul 1944. 14 p. Price: Microfilm - 50¢ - Photostat - $1.00

From an examination of six 70 mm. high explosive rounds and twelve 75 mm. high explosive rounds of Japanese ammunition, it was believed that the steels in the projectile bodies were probably produced in basic open hearth furnaces and, except for the 75 mm. round which was aluminum-killed, were deoxidized with silicon. The high tin residual in most of the 70 mm. projectile body steels suggests that large amounts of scrap were used in the furnace charges. The fuze parts were fabricated from steel, copper, brass and aluminum. There was some indication of a shift from brass to steel in the boosters of these shells. Photographs, microphotographs, and tables showing dates, weights, general features, chemical and spectographic analyses, and other data are included in this report prepared at Battelle Memorial Institute.

PB 21875. GRENELL, L. H. and others. Examination of enemy materiel: Metallurgical examination of one 120 mm Japanese high-explosive naval projectile and three fuzes. Progress report 59, Apr 25, 1944. (OSRD Rept 3745) Jun 1944. 22 p. Price: Microfilm-50¢ - Photostat-$2.00

The steel parts were manufactured from medium (0.51-0.57%) carbon steel made in the basic open-hearth furnace. A nickel content of 0.85% and a chromium content of 0.35% may have been partly derived from scrap, but are probably intentional for hardenability. Vanadium was present in an amount smaller than usual, evidently as a deoxidizer only. Inclusions characteristic of titanium additions were noted. The brass parts were machined from manganese bronze bar stock, most of which had been extruded in bar form. No material changes were observed in the different fuzes. The rotating band was fabricated from electrolytic copper tubing and seated by circumferential pressure. Views of the projectile and fuzes as received are shown in photographs and cross-sectional drawings. The fuzes, were similar with respect to type and number of parts, details of which are tabulated. Details of the manufacture of the projectile, analyses of selected parts and physical test data are also recorded in tabular form. This investigation was made at the Battelle Memorial Institute.

PB 21877. GRENELL, L. H. and others. Examination of enemy materiel: Metallurgical examination of sections of 15, 30, and 50 kilogram Japanese antipersonnel bombs. Progress report 58, Apr 18, 1944. (OSRD Rept 3861) May 1944. 6 p. Price: Microfilm-50¢ - Photostat-$1.00

Basic open hearth steel in the as-rolled or normalized condition was used in the manufacture of the Japanese antipersonnel bombs. The annular rings were machined from bar stock rather than wrapped. None of the parts appeared to be heat treated. The microstructures of the various sections were all similar, that is, pearlite and ferrite ranging from coarse grained to very fine grained resolved at 1000 magnification. This is in keeping with hardness of the steels (R_B-65 to R_B-98). The carbon contents varied from very low (.09%) to medium (.52%) with no definite correlation between corresponding parts of the bombs. Tables show details of manufacture of Japanese antipersonnel bombs and analyses of parts. This investigation was made at Battelle Memorial Institute.

PB 21856. GRENELL, L. H. and others. Examination of enemy materiel: Metallurgical examination of six rounds of Japanese 20 mm A.P. ammunition. Progress report 72, May 18, 1944) (OSRD Rept 3843) Jun 1944. 14 p. Price: Microfilm - 50¢ - Photostat - $1.00

A chemical and metallurgical examination was made of six rounds of Japanese 20 mm. armor piercing ammunition, manufactured in 1941 and 1942. Five of these were of the Oerlikon type; the sixth was of the Hotchkiss type. The most interesting feature of these rounds is the use of high manganese, high sulphur, free-machining steel. The Hotchkiss projectile was made from a highly alloyed W-V-Ni-Cr steel with 2.25% tungsten. Further description of the rounds is included. From the viewpoint of conservation of strategic materials, it is significant to note that in 1942 the Japanese were still using copper-base alloys for small caliber cartridge cases and rotating bands. The use of tungsten steels for armor-piercing projectiles has been thoroughly investigated and rejected by both this country and Germany. It is doubtful if the Japanese can justify this use of tungsten steel, even with the resources of China at their disposal. This report was prepared at Battelle Memorial Institute. Photographs, photomicrographs and tables showing chemical and spectrographic analyses and metallurgical data are included.

PB 21874. GRENELL, L. H. and others. Examination of enemy materiel: Metallurgical examination of six rounds of Japanese 20 mm H. E. ammunition. Progress report 60, May 1, 1944. (OSRD Rept 3746) Jun 1944. 18 p. Price: Microfilm-50¢ - Photostat-$2.00

A chemical and metallurgical examination was made at Battelle Memorial Institute of subject enemy ammunition, manufactured in 1941 and 1942. Five of the rounds were of the Oerlikon type, and the sixth (No. 308) was of the Hotchkiss type. The cartridge cases of the Oerlikon rounds were made from 70-30 brass by conventional methods of deep drawing. The cartridge case of the Hotchkiss projectile was made from 60-40 brass, probably by hot drawing. Of the projectiles, four were made from plain carbon steel of the "free machining" variety, with a sulphur content of about 0.14 percent. One projectile (No. 304) was made from a Ni-Cr-Mo steel. The Hotchkiss projectile was made from plain carbon steel (.39 C), with a phosphorus content of 0.13 percent. The high phosphorus may have been added intentionally to produce a highly brittle steel, thereby improving the fragmentation of the projectile. All the projectiles were machined from bar stock and were of conventional design. All the steels appear to have been titanium-killed. The alloy-steel and Hotchkiss projectiles were heat treated; others were left in the hot-rolled condition. The rotating bands were made from sections of commercial copper tubing, except that of the Hotchkiss projectile which contained about 1.5 percent Si. The fuses were made from leaded 60-40 brass. Chemical and spectrographic analyses of projectiles from 20 mm H. E. shells and metallurgical data are tabulated. Photographs and table of identification markings, weights and volums are included.

PB 21866. GRENELL, L. H. and others. Examination of enemy materiel: Metallurgical examination of three 40 mm Japanese naval projectiles. Progress report 82, Jun 12, 1944. (OSRD Rept 3918) Jul 1944. 16 p.
Price: Microfilm-50¢ - Photostat-$2.00
Two of these shells were high explosive and one was armor piercing high explosive, manufactured in 1935, 1938 and 1940, respectively. When examined at the Battelle Memorial Institute, it was found that the steel parts were manufactured from silicon-killed, medium (.40% - .54%) carbon steel, and with the possible exception of the 1940 shell, were made in a basic open-hearth furnace. The high explosive shells were machined from unheat-treated plain carbon steels, while the high-explosive armor-piercing projectiles was machined from low nickel-chromium steel and differentially hardened. The cartridge cases were made by the usual process of deep drawing from 70-30 brass, but the 1940 case was not mouth annealed as would ordinarily be expected. Discussion of economic considerations relative to manufacturing of these shells, photographs, microphotographs, and tabulated metallurgical, chemical, and manufacturing data are included.

PB 22371. GRENELL, L. H. and others. Examination of enemy materiel (OD-113; AC-77): Corrosion resistance of a steel piston and a magnesium casting from a Japanese oleo landing strut. Progress report 122, Sep 12, 1944. (OSRD Rept 4316) Nov 1944. 17 p. Price: Microfilm-50¢ - Photostat-$2.00
This report, from the Battelle Memorial Institute, covers the examination of the magnesium casting and steel piston of a Japanese oleo landing strut to determine the cause of their resistance to corrosion. The magnesium casting used on this "Betty" landing strut salvaged after some months in salt water appears to have better corrosion resistance that similar American alloys because of a lower iron content. The steel piston is heavily chrome coated. Treatment of metal surface and primer coats by the Japanese seem inferior to American practice in general, though the pretreatment of this magnesium casting was not identified. The discussion of the materials and coatings used is followed by photographs of the casting under tests, and by tables of the results of corrosion tests (500 hours in salt spray) and comparisons of Japanese magnesium alloys with standard specifications, and of physical properties and the effect of corrosion.

PB 21994. GRENELL, L. H. and others. Examination of enemy materiel (OD-113)(AC-77)(N-119): Metallurgical examination of a Japanese 7.92 mm type 1 flexible A/C machine gun (twin barreled) and a flexible ammunition chute for type 2, hand-operated turret 12.7 mm machine gun, Sally and Lily dorsal position. Progress report 193, Jul 12, 1945. (OSRD Rept 5493; War Metallurgy Committee Rept M-577) Aug 1945. 16 p. Price: Microfilm-50¢ - Photostat-$2.00
Except for one Al-Cu-Mg-Mn alloy, one wood, and one leather part of the machine gun, both the gun and the ammunition chute were made entirely from steel. Although considerable machining was done on the individual parts, there was no evidence of the use of high-sulphur free-machining steels. Heat treatment of the steel parts was satisfactorily accomplished with no evident decarburization or quenching cracks. Detailed analyses of selected parts subjected to chemical and spectrographic analysis are found in Table 1, and information on material and treatment found by spark testing, micrography, hardness tests, and macroetching is found in Tables 2 and 3. Photographs are included.

PB 21982. GRENELL, L. H., and others. Examination of enemy materiel (OD-113) (AC-77) (N-119): Metallurgical examination of Japanese 47 mm C/R H.E. U/F shell for model 1 A/T gun. Progress report 210, Aug 11, 1945. (OSRD Rept 5714; War Metallurgy Committee Rept M-595) Sep 1945. 8 p. Price: Microfilm-50¢ - Photostat-$1.00
The 47 mm. projectile was machined from SAE 1060 type steel bar stock, and was heat treated by quenching and tempering to a Vickers hardness of 320. The adapter, which was in the annealed condition, was machined from SAE 1040 type steel bar stock. The cartridge case was deep drawn and mouth annealed from 60-40 brass. The weights, hardness values, and details of manufacture are given in Table 1, and analyses of selected parts from the shell in Table 2. Photographs are included.

PB 21983. GRENELL, L. H. and others. Examination of enemy materiel (OD-113)(AC-77)(N-119): Metallurgical examination of Japanese 105 mm H. E. projectile. Progress report 209, Aug 10, 1945. (OSRD Rept 5713, War Metallurgy Committee Rept M-594) Sep 1945. 8 p. Price: Microfilm-50¢ - Photostat-$1.00
The projectile was forged from steel similar to SAE 1060, and was heat treated by quenching and tempering. The physical properties of this steel were normal. The adapter and the booster were machined from annealed SAE 1030 type and SAE 1025 (with 0.52% Cr) type free-machining steel, respectively. All of the steels were probably manufactured in basic open-hearth furnaces and were silicon-killed. The bourrelet band and rotating band were made from commercial copper seamless tubing. The weights, hardness values, and details of manufacture are given in Table 1, analyses of selected parts in Table 2, and photographs are included.

PB 22602. GRENELL, L. H. and others. Examination of enemy materiel (OD-113): Metallurgical examination of Japanese roller-bearing assemblies from aircraft engine "Zeke." Progress report 23, Nov 1, 1943. (OSRD Rept 2064) Nov 1943. 17 p. Price: Microfilm-50¢ - Photostat-$2.00
Two complete roller-bearing assemblies from the front and center power sections of a Japanese aircraft engine "Zeke" were examined and found to conform to standard American practice for alloy analysis. The steel showed segregation, and was improperly heat-treated. The results of hardness examination by Rockwell, Vickers and Brinnell tests are shown in Table 1; the combined results of chemical and spectrographic analysis in Table 2. Photographs are included.

Swedish

PB 22397. HOYT, S. L. and others. Examination of enemy materiel (OD-113; AC-77): Metallurgical examination of six grades of Swedish carbide tool tips. Progress report 129, Oct 5, 1944. (OSRD Rept 4337) Nov 1944. 12 p. Price: Microfilm-50¢ - Photostat-$1.00
This report from Battelle Memorial Institute, covers the examination of 6 types of Swedish tungsten carbides for composition, microstructure, and methods of manufacture. Determination of the density, hardness, composition and examination of the microstructure show no markedly unusual characteristics for these tool tips over American grades. There was no evidence of the use of tantalum carbide now in common use in American tips for machining steel. Full evaluation would require extensive machining tests using the Swedish carbides. A discussion of the procedure of examination is followed by tables on the chemical analysis of the 6 carbides, X-ray diffraction analysis, and a table of comparison of the American and Swedish carbides. Tables and micrographs are included.

United States

PB 19546. BARRETT, CHARLES S. and others. Deformation characteristics of magnesium alloys (AA-148): Metallography of commercial magnesium sheet. Progress report, Dec 1, 1943. (OSRD Rept 3016. War Metallurgy Committee Rept M-189) Dec 1943. 11 p. Price: Microfilm-50¢ - Photostat-$1.00
In the course of work at Carnegie Institute of Technology on the study of the deformation of magnesium sheet, difficulties were encountered in the delineation of the complete structure, including both twins and the β(Mg-Al) constituent. The etching solution discussed in this report satisfactorily develops twins and precipitates in sheet of both 3% and 6% aluminum compositions. The composition of this solution is as follows: Picric acid, 3 grams; gladial acetic acid 9 ml.; and ethyl alcohol, 85 ml. The process of etching specimens of magnesium alloys by this solution is described and comparisons are made between etchings by this new solution and by commercially used and standard etches. Eighteen photomicrographs are included to illustrate the difference between the new etch, "Modified acetic picral" and other etches. See also PB 19544 - 19545, and PB 19547 - 19549.

PB 19547. BARRETT, CHARLES S., and others. Deformation characteristics of magnesium alloys (MA-148): First quarterly progress report, Jun 15 to Sep 15, 1943. (OSRD Rept 2076. War Metallurgy Committee Rept M-150) Nov 1943. 37 p. Price: Microfilm - 50¢ - Photostat - $3.00

This report of work undertaken at Carnegie Institute of Technology discusses briefly the scope of the study of the deformation characteristics of magnesium alloys. Descriptions of experiments and results are presented under the headings: Effect of cold rolling and recrystallization on textures; effect of roller leveling on textures in "J" sheet production of twins by compression; twinning from bending and from straightening; textures from unusual distortion; and the metallography of crack propagation. Evidence pointed to both inter- and intracrystalline fracture in tension tests of cast magnesium and in bend tests of hot rolled and annealed magnesium sheet. Plans for experiments for the removal or neutralizing of possible embrittling agents are outlined. Tabulated results of tests, a list of references and photomicrographs are included. See also PB 19544-19546 and PB 19548-19549.

PB 19549. BARRETT, CHARLES S. and others. Deformation characteristics of magnesium alloys (MA-148): Second quarterly progress report, Sep 15 to Dec 15, 1943. (OSRD Rept 3272. War Metallurgy Committee Rept M-214) Feb 1944. 47 p. Price: Microfilm-50¢ - Photostat-$4.00

Results of studies of intercrystalline and transcrystalline fractures in pure cast magnesium and additional investigations of twinning in magnesium alloy sheet are presented in this report of work carried on at the Carnegie Institute of Technology. It was concluded that the rate of cooling after solidification determines the type of fracture in an as-cast ingot of pure magnesium. If the ingot is water quenched immediately after solidification, the fracture is intercrystalline, but if the ingot is air-cooled, the fracture is transcrystalline. These fractures may be altered by heat treatment. Transcrystalline fractures of magnesium develop parallel ridges of a crystallographic nature. The amount of twinning of magnesium alloy sheet is determined by the amount and direction of deformation and the original orientation, but not by composition or the amount of prior cold work. Treatment of magnesium with zirconium hydride at 1000° C indicated that the surface oxide of magnesium is probably reduced by its action. The experiments are described and the results discussed. X-ray photographs, photomicrographs, and tabulated data are included. See also PB 19544-19548.

PB 19545. BARRETT, CHARLES S. and others. Deformation characteristics of magnesium alloys: Third quarterly progress report (MA 148) Dec 15, 1943-Mar 15, 1944. (OSRD Rept 3713. War Metallurgy Committee Rept M-276. May 1944. 44 p. Price: Microfilm - 50¢ - Photostat - $3.00

The results of studies of twinning in magnesium alloy sheet of preferred orientation in extruded magnesium slabs, and of intercrystalline and trans-crystalline fractures in pure cast magnesium are presented in this report of work done at Carnegie Institute of Technology. Experiments on twinning in polycrystalline sheet disclosed a strong dependence on temperature. At a slow rate of compression (about 20% reduction in three seconds on the samples used in this test), (102) twinning decreases as the temperature increases and evidences of it are complete absent with deformation at 300°C. This was quite unexpected as all previous work in the literature indicated that (102) twinning is at least as effective at elevated temperatures as at room temperature. The amount of compressive deformation necessary to attain the final orientation is approximately ten times the deformation required at room temperature. Efforts to utilize this knowledge in the production of a randomly oriented sheet were unsuccessful. The experiments are described and results and conclusions are discussed. Drawings showing preferred orientations in magnesium sheet compressed at various temperatures, X-ray photographs, photomicrographs, and tabulated data are included. See also PB 19544 and PB 19546-19549.

PB 19548. BARRETT, CHARLES S., and others. Deformation characteristics of magnesium alloys (MA-148): Fourth quarterly progress report, Mar 15, 1944-Jun 15, 1944. (OSRD Rept 4070. War Metallurgy Committee Rept M-341) Aug 1944. 46 p. Price: Microfilm - 50¢ - Photostat - $4.00

Studies of the effect of deformation and heat treatment on the crystal structure of magnesium alloys are described and the findings discussed in this report of work carried on at the Carnegie Institute of Technology. The information is arranged under the headings: Effect of temperature on {102} twinning in Mh sheet; attempted production of a randomly oriented sheet; attempted production of {101} twinning; determination of alloy in solution in J-lh after various treatments; distribution of precipitate in J alloy; effect of cold work prior to heat treatment on the fracture of pure magnesium, study of residues from sublimation of "pure" magnesium; and resublimation and vacuum melting of magnesium. X-ray photographs, photomicrographs, and a schematic diagram of a distillation apparatus to be used for the sublimation of magnesium are given. See also PB 19544-19547 and PB 19549.

PB 19544. BARRETT, CHARLES S., and others. Deformation characteristics of magnesium alloys (MA-148): Final report. (OSRD Rept 4653. War Metallurgy Committee Rept M-454) Jan 1945. 88 p. Price: Microfilm-$1.00 - Photostat-$6.00

The introduction to this final report of work carried on at the Carnegie Institute of Technology contains a brief outline of the scope of the research work and a short résumé of the literature on the deformation of magnesium. In the experiments the dependence of {102} twinning on speed and temperature of deformation was demonstrated. Twinning decreases with increasing temperature and decreasing speed of deformation. The pronounced change in orientation (86°) which is produced by {102} twinning, combined with the above knowledge, was employed to produce a randomly oriented magnesium sheet. The occurrence of {102} twinning and slip on the basal plane in polycrystalline magnesium was confirmed. Fracture studies of pure magnesium melted from distilled crystals under a chloride flux revealed the dependence of the type of fracture on the rate of cooling from the melt. Sublimation studies at 480° C. in a vacuum of 0.005 microns indicated the presence of thin films located at the grain boundaries, extending in from the thicker film of MgO that forms the outer surface of a sample. X-ray measurement of the amount of precipitation in J-alloy was performed in cooperation with a project at Rensselaer Polytechnic Institute and detailed results are included in this report. Procedures are suggested for the removal of embrittling agents, but time did not permit carrying out this program to completion. X-ray photographs, drawings, photomicrographs, and a bibliography are included. See also PB 19545-19549.

PB 21117. BOHNENBLUST, H. F. and others. Graphical solutions for problems of strain propagation in tension. (OSRD Rept 1204; NDRC Armor and Ordnance Rept A-131) Jan 1943. 29 p. Price: Microfilm - 50¢ - Photostat - $2.00

The theory of the propagation of plastic waves in tension developed by Th. von Karman, "On the propagation of plastic deformation in solids" (OSRD No. 365) has been elaborated in several recent reports. The present report describes graphical methods for the construction of strain-distribution and stress-time diagrams for specimens subjected to tension impact. It shows that the basic diagram necessary for the construction of the stress-time and strain-distribution curves is the $x, \frac{1}{c}$-diagram. The latter is a graphical means of representing the process of plastic propagation and the steps for the construction of this diagram are outlined both for an infinitely long wire and for a bar of finite length. The complications which arise when unloading takes place after a given interval of time are also discussed, and the methods for the graphical determination of strain-distribution and stress-time curves in this case are presented. Schematic examples of the various diagrams and curves are shown in detail. The report is documented.

PB 19783. CHIPMAN, JOHN. Report on effect of alloying elements upon the physical and magnetic properties of Hadfield's steel for armor plate, to Nov 11, 1941. (OSRD Rept 191). Dec 1941. 23 p. Price: Microfilm-50¢ - Photostat-$2.00
Hatfield's manganese steel is non-magnetic and possesses excellent physical properties, as compared to magnetic alloy steels. It might therefore be useful for non-magnetic armor plate. The present report shows that the hardness, yield point, and ultimate tensile strength may be greatly improved by cold working or by the addition of alloying elements or by a conciliation of the two. Heat treatment alone proved ineffective. Tables. This is a report under contract with the Massachusetts Institute of Technology.

PB 20208. CLARK, D. S. and others. Behavior of metals under dynamic conditions (MO-11) (NS-109): Influence of impact velocity on the tensile properties of NE 8715, NE 9415, SAE 1045, and SAE 1090 steels. Progress report, Mar 15, 1944. (OSRD Rept 3695; NDRC Rept 18:30; War Metallurgy Committee Rept M-257) May 1944. 51 p. Price: Microfilm-$1.00- Photostat-$4.00
The results of tensile impact tests on NE 8715, NE 9415, SAE 1045 and SAE 1090 steels are presented in this report prepared at the California Institute of Technology. The two NE steels were heat-treated in the manner typical of that for a carburized steel. The two SAE steels were heat-treated by annealing at a high temperature and a low temperature, normalizing, spheroidizing, and quenching and tempering. Of the two carburizing steels, the greatest energy absorbing capacity was found for the NE 9415 steel. For the particular heat treatments given to the SAE 1045 and SAE 1090 steels, the former tends to have somewhat better energy absorbing capacity than the latter. However, the spheroidized SAE 1090 steel has about the same energy absorbing capacity as the SAE 1045 steel spheroidized. The critical velocity of both spheroidized steels is about 110 ft/sec which is the lowest obtained with any treatment. The report includes tables giving results of the tests, photomicrographs, plotted curves, and a diagram showing comparison of static and dynamic tensile properties of these steels.

PB 20209. CLARK, D. S. and others. Behavior of metals under dynamic conditions (No-11) (NS-109): Some static and dynamic properties of Zamar II die cast alloy in relation to its use in Mark 140 (HIR3) fuse. Progress report, Jan 31, 1944. (OSRD Rept 3425; NDRC Rept 18:29; War Metallurgy Committee Rept M-234) Mar 1944. 39 p. Price: Microfilm-50¢ - Photostat-$3.00
The purpose of this investigation at the California Institute of Technology, reported herein, was to determine the suitability of using Zamac II die casting alloy for parts of the Mark 140 (HIR3) fuse. Part I of this report covers the investigations of the static and dynamic tensile properties of this zinc base alloy for a range of temperatures varying between 70° F. and -58° F. It also presents the static compressive properties of the alloy at about 70° F. and the static bending characteristics of the diaphragm at temperatures from about 70° F. to -58° F. Part II includes the computation of the maximum permissible load on the diaphragm seat under static and dynamic conditions. The results of the computations are discussed in relation to the deceleration to which the fuse may be subjected under conditions of water entry. Part III presents the results of tests to determine the size of impression made by a steel ball when pressed into a flat surface of Zamac II alloy under different loads. Drawings of testing equipment, plotted curves, and tabulated data are included.

PB 20215. CLARK, D. S. Behavior of metals under dynamic conditions (NS-109): Final report, Feb 15, 1945. (OSRD Rept 4868; NDRC Rept 18:43; War Metallurgy Committee Rept M-492) Mar 1945. 22 p. Price: Microfilm-50¢-Photostat-$2.00
This report presents a general summary of the work accomplished on the above subject at the California Institute of Technology during the period from March 15, 1942 to December 31, 1944. The principles underlying the development of plastic strain propagation theory are briefly presented, together with a brief summary of experimental results. The work covered includes tension impact, compression impact, impact on beams and plates, pure rate of strain, and rapid loading. The author concludes that while much still remains to be learned about the behavior of metals under dynamic conditions, the work covered in this investigation has greatly clarified the situation and the concept of rapid loading seems to be of the greatest importance from the practical point of view. A list of OSRD reports on the behavior of metals under dynamic conditions is included.

PB 21112. CLARK, D. S. and others. The influence of impact velocity on the tensile properties of three types of ship plate: MS, HTS, STS. (OSRD Rept 3420; NDRC Armor and Ordnance Rept A-261) Mar 1944. 36 p. Price: Microfilm - 50¢ - Photostat - $3.00
This report covers the results of tests made in the interest of the Bureau of Ships, U. S. Navy Department, on the dynamic tensile properties of MS, HTS and STS ship plate. The tests were made at impact velocities up to 200 ft/sec. The results show that (1) MS and HTS plates have the greatest increase in ultimate strength under dynamic conditions, (2) STS plate has the greatest increase in elongation dynamically, (3) while STS plate shows the greatest increase of energy required to fracture with velocity, the three kinds of plates require approximately the same energy to fracture, (4) the critical velocities are between 125 and 150 ft/sec for MS and HTS plates and about 200 ft/sec for STS plate, (5) no marked directional properties were detected in MS and HTS plates, (6) Izod impact values are the greatest for HTS, and the smallest for MS plates. Tables, graphs and photomicrographs are included.

PB 21111. CLARK, D. S. and others. The influence of velocity on the tensile properties of a carbon steel, two national emergency steels, and a manganese steel. (OSRD Rept 3180; NDRC Armor and Ordnance Rept A-241) Jan 1944. 52 p. Price: Microfilm - $1.00 - Photostat - $4.00
This report describes an extension of previous work concerning the static and dynamic tensile properties of heat-treated steels. Part I presents the results of additional tests on the SAE T1345 steel at a quenched and tempered hardness of 47 Rockwell C, since this steel, receiving the same type treatment, was brittle at a hardness of 51 Rockwell C. It is concluded that a hardness of about 47 Rockwell C is the upper limit for this steel, quenched and tempered, for satisfactory dynamic performance. Part II presents the results of static and dynamic tests on National Emergency (NE) 8739 steel and an NE 9445 steel treated by two methods of heat treating; namely, quenching and tempering, and austempering. Each steel was heat-treated to a hardness of about 31 and 51 Rockwell C. The results show that these two steels are equal, if not superior, to the SAE steels with which they have been compared insofar as tensile impact properties are concerned. Part III presents the results of static and dynamic tests on an SAE 1040 steel heat-treated in four different ways; namely, annealing, spheroidizing, oil quenching and tempering, and water quenching and tempering. It is shown that for this steel no specific treatment has proved superior to others. Part IV presents the results of static and dynamic tests on an SAE X1020 steel and compares these results with those obtained on an SAE 1040 steel heat-treated to approximately the same hardness. Some evidence is presented to show that the SAE 1040 steel possesses somewhat better dynamic properties than the SAE X1020 steel when both are heat-treated to give a hardness of about 35 Rockwell C. Tables, graphs and photomicrographs are included.

PB 20226. DAVIS, HARMER E. and others. Behavior of steel under conditions of multiaxial stresses and effect of welding and temperature on this behavior (NS-306): Pilot tests of small tubular specimens. Progress report, Oct 15, 1944. (OSRD Rept 4553); War Metallurgy Committee Rept M-405) Jan 1945. 77 p. Price: Microfilm-$1.00 - Photostat-$6.00
Experimental work is described and results presented in this report of tests on twelve 5-1/4 inch diameter thin-walled tubes of aluminum-deoxidized steel subjected to various com-

ditions of biaxial stress. These experiments comprise the "pilot" series of tests in a larger investigation on the behavior of ship-plate steel under multi-axial stress conditions. The ductility of the metal under various biaxial stress conditions and at two temperatures, 70° F and -138° F, is reported. The evidence indicated that the metal is reasonably ductile, even at the low temperature, provided it is subjected only to a state of plane stress. If a state of triaxial stress is induced by restraint or by discontinuities in the material, the ductility may be greatly reduced at low temperature. Evidence is presented to indicate that fracture may occur either by shear or by cleavage, depending upon the stress and temperature conditions. In a majority of cases, reasonable prediction of the stress-strain behavior of the metal in the plastic range can be made for various biaxial stress conditions from the data of the simple tension test, by use of the modified octahedral-shear concept. Appendix A consists of an article on the preliminary experiments on strain-gage measurement. Appendix B is an abstract of the work of J. E. Dorn and his collaborators, giving the development of the stress and strain functions discussed in the body of this report. Photographs and diagrams of testing equipment, stress-strain curves, photomicrographs, photographs of tubes after rupture, and a bibliography are included in this report prepared at the University of California.

PB 20199. DOAN, G. E. Weldability of steel for hull construction (NS-856) Final report, Aug 31, 1945. (OSRD Rept 6263; War Metallurgy Committee Rept M-612) Oct 1945. 47 p. Price: Microfilm-50¢ - Photostat-$4.00
Part I of this report describes tests made to determine the ability of a test developed at Lehigh University to screen out heats of steel which display a sensitivity to cracking during fabrication. Part II describes an investigation of factors affecting weldment ductility and discusses testing methods which might be used to advantage in determining the influence of such factors as metallurgical structure, dissolved gases, and residual stresses on the ductility of a welded steel. Part III consists of a report on residual stress pattern in Lehigh weldability specimens by J. T. Norton and D. Rosenthal, of the Massachusetts Institute of Technology. Photographs, plotted curves and tabulated data are included. See also PB 20224.

PB 19498. DORN, J. E. and RALLASHUS, A. C. Formability of magnesium alloy sheet: Final report, Part I, Elevated temperature variable speed tensile tests on magnesium alloys (NA-146), Sep 24, 1943. (OSRD Rept 2062) Nov 1943. 130 p. Price: Microfilm-$1.50 - Photostat-$9.00
This is a summary of the tensile test investigations at elevated temperatures and at various speeds on six magnesium alloy sheet materials. Investigations were carried on at the University of California. In order to provide adequate data for the determination of the formability of magnesium alloy sheet, flow curves were obtained in this investigation for strain rates of about 10 inches per minute to approximately 140 inches per minute over the useful range of forming temperatures from atmospheric temperature to 700°F. The data given in the numerous curves and tables are useful in determining the sizes and dimensions of parts attainable in a number of forming operations. Photographs of the testing apparatus, photographs and diagram of tensile test specimens and a bibliography are included.

PB 20203. DUWEZ, P. E. AND CLARK, D. S. Behavior of metals under dynamic conditions (NS-109): A preliminary investigation of the mechanism of penetration from the standpoint of strain propagation. Progress report, Jun 1, 1944. (OSRD Rept 3957; NDRC Rept 18:34; War Metallurgy Committee Rept M-517) Jul 1944. 15 p. Price: Microfilm-50¢ - Photostat-$1.00
Previous investigations in the field of strain propagation (See PB 20206) lead to the belief that the mechanism of penetration of plate by projectile might be, to a large degree, explained on the basis of the theory of strain propagation. In the investigation presented in this report tests were made in which a pointed nose projectile was fired at copper discs of different thicknesses at a velocity of 3900 feet per second. The results are discussed and interpreted on the basis of the theory of strain propagation. No conclusions are presented in view of the exploratory character of the tests. Curves showing velocity of propagation versus strain, photographs of disks and tabulated data are included.

PB 20207. DUWEZ, P. E. and others. Behavior of metals under dynamic conditions (NO-11) (NS-109): Influence of impact velocity on the tensile properties of furniture steel sheets. Progress report, Mar 24, 1944. (OSRD Rept 3696; NDRC Rept 18:31; War Metallurgy Committee Rept M-264) May 1944. 37 p. Price: Microfilm-50¢ - Photostat-$3.00
An investigation was made at the California Institute of Technology for the purpose of comparing the influence of impact velocity on the tensile properties of furniture steel and ship plate. The furniture steel supplied by the Bureau of Ships included the following thicknesses: 0.035 inch, 0.060 inch, and 0.109 inch. Specimens of these sheets were cut both parallel and perpendicular to the direction of rolling. The results of the tests described in this report show that: I) the ultimate strength of all the sheets was increased above the static value; II) the percentage elongation in 7 inches under dynamic conditions is less than under static conditions; III) the dynamic energy absorbed per unit volume is about the same or less than the energy absorbed statically except for the 0.109 inch sheet parallel to the direction of rolling; IV) the greatest influence of direction is shown in sheets 0.035 inch and 0.060 inch thick; and V) while the static properties of furniture steel are reasonably close to those of some ship plate, the dynamic properties are very different. The report includes a bibliography, tabulated results, photomicrographs, drawings, force-time diagrams, and stress-strain curves.

PB 20219. DUWEZ, P. E. and others. Behavior of metals under dynamic conditions (NS-109): Application of pure strain rate tests to an investigation of two 76 mm gun tubes. Progress report, Dec 15, 1944. (OSRD Rept 4729; NDRC Rept 18:40; War Metallurgy Committee Rept M-460) Feb 1945. 30 p. Price: Microfilm-50¢ - Photostat-$2.00
The results of an investigation of two 76 mm gun tubes supplied by Watervliet Arsenal, and which had been ruptured by detonation of a high explosive shell in the bore are presented in this report prepared at the California Institute of Technology. One tube fragmented badly while the other exhibited a ductile fracture. Specimens taken from each tube consisted of thin wall tubular cylinders which were tested both statically and dynamically under uniaxial stress conditions. The dynamic tests were made at strain rates as high as 190 in./in./sec. Rupture of some of the specimens occurred with very low maximum uniform strain. Static tensile tests and Izod impact tests failed to reveal any difference in the two gun tubes. The tests on the uniaxial thin wall specimens showed that the gun tube which failed in a brittle manner had a very low maximum uniform strain while the gun tube which failed in a ductile manner had a much higher maximum uniform strain. These results are discussed in relation to the influence of strain rate on the properties of each material and the effect of metallographic structure on the results. The conclusions cannot be applied to all gun tubes until other guns are investigated. The report includes photographs and drawings of the equipment, tabulated results, photomicrographs, force-time diagrams, and plotted curves.

PB 20221. DUWEZ, P. E. and others. Behavior of metals under dynamic conditions (NS-109): Preliminary study of the influence of rapid loading and time at load on the initiation of plastic deformation in tension. Progress report, Dec 1, 1944. (OSRD Rept 4621; NDRC Rept 18:38; War Metallurgy Committee Rept M-450) Jan 1945. 32 p. Price: Microfilm-50¢ - Photostat-$3.00
This report of work carried on at the California Institute of Technology presents a discussion of the distinction between impact and rapid loading and points to the significance of the latter in practical problems involving dynamic loading of structures and machine parts. The simple equipment used in making a preliminary study of rapidly applied sustained loads is described. The results of tests made with this

equipment on hot rolled SAE 1015 steel and 24S-T aluminum alloy are presented. The time required to attain the specified stresses varied between 0.23 and 1.60 sec. These tests lead to the conclusion that a stress higher than the static elastic limit may be rapidly applied to an SAE 1015 steel and be sustained for a certain duration without effecting permanent deformation. Somewhat erratic results are reported for 24S-T aluminum alloy which may indicate that the rate of loading was too low to be very effective. Included are tabulated results, stress-time diagrams, photographs and drawings of equipment, photomicrographs, and a typical oscillograph record.

PB 20204. DUWEZ, P. E. and others. Behavior of metals under dynamic conditions (NS-109): The behavior of clamped beams under impact loading. Progress report, Jul 1, 1944. (OSRD rept 4043; NDRC Rept 18:35; War Metallurgy Committee Rept M-338) Aug 1944. 27 p. Price: Microfilm-50¢ - Photostat-$2.00

The results of impact tests on rectangular and "I" beams of 24ST aluminum alloy are presented in this report of work carried on at the California Institute of Technology. These beams, approximately 2 in. deep, 40 in. long, with a moment of inertia of about 0.8 in.4, were clamped at the ends and struck at the center by a hammer (4.6 and 41.6 lb.) at velocities ranging from 39 to 177 ft/sec. The deflection of the beam was measured after impact while the force acting on the hammer during impact was recorded. From these tests it was shown that the center deflection of the beam increases almost linearly with the kinetic energy of the hammer, the damage to a beam by an impact with a given kinetic energy is greater with a heavy hammer and a low impact velocity than with a light hammer and a high impact velocity, and less damage is observed under impact in a rectangular beam than in an "I" beam of the same section modulus.

PB 20220. DUWEZ, P. E. and others. Behavior of metals under dynamic conditions (NS-109): The influence of pure strain rate on the tensile properties of three types of ship plate. Progress report, Dec 11, 1945. (OSRD Rept 4773; NDRC Rept 18:39; War Metallurgy Committee Rept M-459) Feb 1945. 78 p. Price: Microfilm-$1.00 - Photostat-$6.00

The results of uniaxial tension tests on MS, HTS, and STS ship plate at pure strain rates up to about 200 in./in./sec. are given in this report of work carried on at the California Institute of Technology. The equipment by which these tests were made involved the use of a tubular specimen which was subjected to internal pressure to produce only circumferential stress. In these tests propagation effects were eliminated, thus permitting a study of the influence of strain rate on the tensile properties. The fundamental basis for this work is discussed. Since the specimens consisted of thin wall tubes, approximately 0.013 inches thick, inhomogeneities and segregation in the structure are highly influential on the results of the tests. The experiments are described and results and conclusions of static, strain rate, and notched bar impact tests are discussed. HTS plate appears to be superior to the other two plates tested. No relation could be found between the thicknesses of the plates and the test results. The report includes tabulated results, photographs and drawings of equipment, photomicrographs, and stress-strain curves.

PB 20205. DUWEZ, P. E. and others. Behavior of metals under dynamic conditions (NS-109): The propagation of plastic strain in compression. Progress Report, May 15, 1944. (OSRD Rept 3886; NDRC Rept 18:33; War Metallurgy Committee Rept M-302) Jul 1944. 51 p. Price: Microfilm-$1.00 - Photostat-$4.00

The results of study of the phenomenon of strain propagation in compression is presented in this report prepared at the California Institute of Technology. The work is an extension of prior verification of the von Karman theory of strain propagation in tension. Tests were made on annealed copper, cold drawn copper, annealed SAE 1020 steel, cold drawn SAE 1020 steel, Zamak II alloy die cast, and lead. The report shows that the theory of strain propagation is valid in compression for strains less than that at which the inflection occurs in the static compression stress strain curve. It is shown that the compressive elastic limit of annealed SAE 1020 steel under dynamic conditions is about twice the static value. The experiments which lead give evidence of the existence of a critical velocity in compression of about 100 ft/sec. It is estimated that the critical velocity of annealed copper, cold drawn copper, cold drawn SAE 1020 steel are approximately 1050 ft/sec, 1220 ft/sec, and 1400 ft/sec, respectively. The critical velocity of a class B armor plate is about 1750 ft/sec. The propagation of strain in compression may be applicable to the mechanism of armor penetration. An application of the principle of strain propagation to a study of the failure of an extrusion press is discussed in the appendix. The report includes a bibliography, tabulated data, stress-strain curves, theoretical curves and drawing of extrusion press.

PB 20815. FUSFELD, HERBERT I, and others. Correlation of earing tendency in rolled steel strip with Chladni figures: First report. (Frankford Arsenal Ordnance Lab Rept R-608) Mar 1945. 20 p. Price: Microfilm-50¢ - Photostat-$2.00

Chladni figures were obtained on discs stamped from rolled steel strip. The discs were supported at four points on their circumference and vibrated by contact with the needle of a photograph cutting head driven by a beat frequency oscillator. At the fundamental frequency of the disc, hyperbolas are formed, as previously described by Tammann, who investigated the variations in the separation of the hyperbola vertices with changes in preferred orientation of rolled discs("On acoustic figures on rolled plates", by Tammann-Zeitschrift für Metallkunde, April 1926; "On the change of sonorous figures on rolled plates at their recrystallisation", by Schröder and Tammann - Zeitschrift für Metallkunde, June 1924). The present work is an attempt to correlate these vertex distance variations with earing tendency of different steels. Specimens for the comparison of Chladni figures with earing tendency were prepared by cold-rolling three groups of normalized WD 1010 steel strip, giving reductions of 10, 30 and 60 percent, and followed this with a spheroidizing anneal. The earing tendency of each strip prepared in this manner was checked by preparing from them caliber .30 first draw pieces. A variation in earing tendency from group to group was found which was satisfactory for the correlation test. This tendency was greater, the more severe the cold reduction preceding the sub-critical anneal. The appendix presents data on X-ray diffraction patterns. References and photographs are included.

PB 17094. GAINES, O. I. Gas alarms. (CWS Tech Div Memo Rept 224) May 1940. 9 p. Price: Microfilm-50¢ - Photostat-$1.00

The characteristics selected for incorporation in a specification for a gas alarm as a result of these tests and military requirements are: A. Construction. 1. Construction to be sturdy and compact, 2. Limit of overall dimension 12 inches, 3. Crank to rotor connected by direct acting clutch, 4. Design limits for crank and handle grips, 5. Specified rigidity of guard, 6. Incorporation of rain cover, 7. Requirement for finish, and 8. Weight limit. B. Performance. 1. Tone requirement, 2. Sound range, and 3. Time response.

PB 20214. GENSAMER, M. and others. Plastic flow of aluminum aircraft sheet under combined loads (NA-149) (NA-150): Part I, Development of tests for forming limits; stress-strain curves under combined loads. Final report, Dec 31, 1944. (OSRD Rept 5282; War Metallurgy Committee Rept M-527) Jun 1945. 34 p. Price: Microfilm-50¢ - Photostat-$3.00

Several tests were developed at Carnegie Institute of Technology for the purpose of studying the plastic behavior of aircraft sheet materials under different combinations of the principal strains. In this report, the testing apparatus and test procedures used in these tests are described in detail. The tests include the circular hydraulic bulge test (balanced biaxial tension); the elliptical hydraulic bulge test (unbalanced biaxial tension); a micro-compression test, capable of producing large plastic strains in sheet specimens; and a micro-tension test, designed to check against size effects in the micro-compression specimens. Each of

these tests has been applied to a study of the stress-strain relationships in the plastic range for 24S-O and 24S-T sheet, and it is demonstrated that the stress-strain curves obtained in the various tests coincide within the limits of experimental error if plotted as "significant" stress-strain curves. This permits the stress-strain curve for any method of loading to be derived from a single stress-strain curve obtained under some particular loading method. Photographs and drawings of testing equipment, stress-strain curves and a short bibliography are included.

PB 20213. GRANGE, R. A. The effect of boron upon the structure and heat-treating characteristics of steel: Report. (OSRD Rept 1699; War Metallurgy Comittee Rept M-112) Aug 1943. 18 p. Price: Microfilm-50¢ - Photostat-$2.00
This report describes investigations carried out by the United States Steel Corporation Research Laboratory at Kearny, New Jersey, to study the effect of a small amount of boron upon the microstructure and heat-treating characteristics of steel. At the time of the publishing of this report, the investigations had been limited principally to a steel containing 0.63% carbon and 0.87% manganese. Samples from adjacent ingots of the same heat, to one of which 0.0025% boron as ferro-boron was added, were treated identically and compared. Discussions are included regarding the observations made during these tests, the effect of boron upon the isothermal transformation diagram, austenite grain size, hardness, the boron constituent, anomalies in the hardenability of the boron steel, and metallographic test for boron in steel. Isothermal transformation curves, with and without boron, photomicrographs, and hardenability curves are also given. See also PB 20210-20212.

PB 4429. HOLLOMON, JOHN H. and NORTON, M. R. Effect of grain size on the bainite transformation. (Watertown Arsenal Lab Rept 310/39) Nov 1944. 29 p. Price: Microfilm-50¢ - Photostat-$2.00
Microstructural and hardness survey have been obtained for several Jominy specimens for which different grain sizes were established by austenitizing at various temperatures. An SAE 4140 steel was used for the investigation because, when this steel is quenched, the formation of martensite is restricted by the formation of bainite rather than pearlite. The details of the microstructures formed at the various cooling rates of the several specimens are presented and discussed. The structures of the large grain-sized specimens reveal that the martensite and bainite form on definite crystallographic planes. No precise determination of the identity of the planes was made but it has been shown that at high temperatures of formation the bainite forms very nearly parallel to the planes of the parent austenite.

PB 19541. HUNTER, M. A. and others. Physical and stress corrosion properties of magnesium alloy sheet (MA-147): Progress report, Jun 1 - Oct 31, 1943. (OSRD Rept 2063. War Metallurgy Committee Rept M-152) Nov 1943. 50 p. Price: Microfilm-50¢ - Photostat-$4.00
This report covers investigations on the optimum conditions for short time testing of the stress-corrosion cracking of magnesium alloy sheet carried on at Rensselaer Polytechnic Institute. Data on the correlation of microstructure with the susceptibility to stress-corrosion cracking is also included. Two important facts brought out in this report are: (1) That a relief anneal at 250° F subsequent to cold rolling raises the stress corrosion cracking limit in the magnesium alloys which came under this investigation; and (2) that this relief anneal had caused a considerable amount of precipitation within the grains of the sheet. Tables are included showing: I. Effect of pH on time of stress cracking under constant load, II. stress corrosion cracking of commercial alloys under constant load; III. stress rack observations on stress corrosion cracking; IV. tensile tests of Dow alloys and American Magnesium alloys; V. corrosion cracking of prestressed specimens; and VI. tensile and compressive yield strength after roller straightening. A number of stress-corrosion curves are also included. See also PB 19539 - 19540, 19542 - 19543.

PB 19543. HUNTER, M. A. Physical and stress corrosion properties of magnesium alloy sheet (MA-147): Progress report, Sep 1 to Dec 1, 1943. (OSRD Rept 3175. War Metallurgy Committee Rept M-197) Jan 1944. 21 p. Price: Microfilm-50¢ - Photostat-$2.00
This second quarterly report presents a description of experiments at Rensselaer Polytechnic Institute on the effect of heat treatment on the stress corrosion cracking of magnesium alloy sheet. It was found that a temperature of 650° F for one hour is sufficient for complete solution of precipitate in magnesium sheet. In this condition, the sheet has a low stress corrosion limit, and when this solution treated material is cold rolled, the stress corrosion cracking limit is again very low. Observations on cracking times were made on material heated to 250° F, 350° F, and 450° F for various periods of time. While there appeared to be little difference in cracking time for materials heated for 8 hours at 250° F and for 2 hours at 350° F, the former procedure affects the physical properties to a less degree and is to be preferred. The results of tests made to show the effects of heat treatment on stress corrosion cracking on Dow J-1h and FS alloys and American Magnesium Company 57SH and 52SH alloys are given. Results of tests on the effect of pH of corroding solutions on cracking times in heat treated sheets are also included. See also PB 19539 - 19542.

PB 19540. HUNTER, M. A. and others. Physical and stress corrosion properties of magnesium alloy sheet (MA-147): Progress report. (OSRD Rept 3477 War Metallurgy Committee Rept M-237) Apr 1944. 61 p. Price: Microfilm-$1.00 - Photostat-$5.00
This report presents results of work at Rensselaer Polytechnic Institute on the effects of heat treatment on the physical and stress corrosion properties of magnesium alloy sheet. Tests were made on commercial sheet of the J-1h variety which had been aged for 8 hours at 250° F and other sheets which had been aged for 2, 8 and 24 hours respectively at 350° F. Judged solely from the point of view of stress corrosion, there was little to choose from between material heat treated for 8 hours at 250° F, or 2 hours at 350° F. The difference, however, in physical properties was very marked. The best compromise would seem to be to use 8 hours at 250° F as the aging treatment for minimizing stress corrosion. There is also discussion of solution treatments before cold rolling, hot and warm rolling of magnesium sheet, and stress corrosion on alternate cold rolling and heat treatment. A number of experimental magnesium alloys were melted, fabricated to sheet and tested in tension and stress-corrosion. These included magnesium-aluminum tin, magnesium-aluminum-cadium, and other alloys with additions of arsenic, antimony and titanium and zirconium. Compositions of these alloys and their tensile and stress-corrosion properties are listed. Photomicrographs, stress-corrosion curves and numerous tables of results are included. See also PB 19539, 19541 - 19543.

PB 19542. HUNTER, M. A. and others. Physical and stress corrosion properties of magnesium alloy sheet (MA-147): Progress report, Jan 15, 1945. (OSRD Rept 4824. War Metallurgy Committee Rept M-471) Mar 1945. 78 p. Price: Microfilm - $1.00 - Photostat - $6.00
This report of work carried on at Rensselaer Polytechnic Institute presents results of further investigations of heat treatments on the physical and stress corrosion properties of magnesium alloy sheet. In this report the tests and results are discussed under the following headings: Additional data on the effect of heat treatment of AM-C52Sh sheet at 350°F compared to eight hours at 250°F.; effect of hot forming temperatures after a heat treatment of eight hours at 250°F; the effect of warm rolling on mechanical properties and stress corrosion on "J" alloys; warm stretching magnesium; effect of alternate rolling and heat treatment procedures on stress corrosion; protective coatings; general corrosion; experimental magnesium alloys; and quantitative methods for determining stress corrosion. Stress curves and drawings of direct tension apparatus are included. See also PB 19539-19540, 19543.

PB 19539. HUNTER, M. A. and others. Physical and stress corrosion properties of magnesium alloy sheet (MA-147): Final report, Oct 31, 1945. (OSRD Rept 6596; War Metallurgy Committee Rept M-647) Feb 1946. 174 p. Price: Microfilm-$2.00 - Photostat-$12.00
This final report summarizes the results of investigations carried on at Rensselaer Polytechnic Institute, Part I of

this volume describes and gives results of laboratory experiments made to improve the physical and stress corrosion properties of magnesium alloy sheet. It covers the results of various heat treatments, rolling procedures and combinations of the two. It was concluded that a treatment for 8 hours at 250° F. appeared to be the best choice to retain physical properties and increase resistance to stress corrosion. In addition brief discussion is presented of the effects of certain surface treatments. Part II contains information concerning some experimental alloys. It is limited to the effects of minor additions and minor variations in melting practice, upon the properties of alloys of the J-1 and JS-1 types. Part III discusses a number of new alloys of widely varying compositions made at Rensselaer. The purpose was to develop improved properties by heat treatments as a result of precipitation or age hardening. Numerous data are included. Appendix I contains a comprehensive discussion of methods for determining stress corrosion resistance. Appendix II contains a summary of strain rack tests in chromate solution and in air. This report contains many tables showing compositions of the various alloys, their physical and tensile properties, and results of tests; photomicrographs; and plotted curves. See PB 19540-19543 for earlier reports.

PB 16426-16428, 16762. MANILDI, J. F. and others. Non-destructive testing of flashwelds (OD-86). (OSRD Repts.) Jan, Sep, Nov 1944.

PB No.	OSRD Rept No.	Date	Pages	Price Microfilm	Price Photostat
16762	3210	May 1, 1943-Jan 28, 1944	73	$1.00	$5.00
16428	4144	Apr 1, 1944	24	.50	2.00
16427	4140	May 29, 1944	34	.50	3.00
16426	4404	Nov 30, 1944	130	1.50	9.00

Three progress reports and a final report present data on the work on non-destructive testing of flashwelds which was done under NDRC contract at California Institute of Technology. Progress Report 1 (PB 16762) gives a description of and results obtained from a number of non-destructive tests of flashwelds in X4130 steel; Progress Report 2 (PB-16428) presents the results of preliminary magnetic retentivity tests on flashwelds made in 1 inch OD tubing of SAE-X4130 steel; and Progress Report 3 (PB 16427) presents the results of eddy current tests on a group of 54 flashwelds in 4" O.D. 0.25" wall thickness tubing of SAE-X4130 steel. The final report (PB 16426) indicates that four methods may be used in detecting flashweld flaws. The first method is the standard magnetic powder testing process, which consists of magnetizing the specimen longitudinally, pouring an emulsion of oil and magnetic powder over the specimen, and observing the regions where the powder adheres to the specimen. The second method is the direct current potential drop test. This consists of passing a direct current longitudinally in a welded specimen and exploring the weld region with potential probes and a sensitive microammeter, noting deviations from a uniform potential drop across the weld. The third method consists of rotating a previously magnetized specimen in a lathe or similar machine and picking up the voltage induced by surface residual magnetism in the region of the weld with a coil similar to the coils used in magnetic tape recording. Discontinuities in the output voltage wave, which are observed on the oscilloscope, are indicative of weld conditions. The fourth method consists of measuring the deviation from a normal eddy current flow pattern in the region of the weld. The deviations are produced by the flaws present in the weld. Photographs, diagrams and graphs and tables of data are included. Bibliographies are given in the final report and in PB 16762.

PB 20606. MARKUS, H. Investigation of 90/10 gilding metal as a substitute material for artillery cartridge cases: First and final report. (Frankford Arsenal Ordnance Lab Rept 86) Oct 1941. 14 p. Price: Microfilm-50¢ - Photostat-$1.00

Tensile strength, hardness, and microstructure of a fourth draw piece and a headed case made by the Bridgeport Brass Company from 90/10 gilding metal have been determined. It has been found that the mechanical properties at the head of the cases do not meet specifications. Investigations by the Bridgeport Brass Company and the Chase Brass and Copper Company are in agreement with these findings. The Chase Brass and Copper Company have reported that this material is also unsuitable because of the difficulties involved in pickling, in lubrication, excessive loading of the tools, and in machining the drawn cases. It is suggested that a small quantity of artillery cartridge cases be manufactured from 80/20 brass. The difficulties found in using gilding metal indicated that an increase in zinc content would lend itself to the production of a more suitable cartridge case. Tables and photographs are included.

PB 20610. MARKUS, HAROLD. Review of Frankford Arsenal data on Everdur for cartridge cases: First report. (Frankford Arsenal Ordnance Lab Rept R-152) Jan 1942. 19 p. Price: Microfilm-50¢ - Photostat-$2.00

This report is concerned with the properties of the alloy, Everdur 1015 or Everdur "B", a product of the American Brass Company. This is not the only silicon copper alloy suitable for producing artillery cartridge cases, but it was the only one on which studies had been prepared. Other materials which it was assumed would be suitable for producing cartridge cases were such alloys as Duronze I, Olympic B, PMC 3, 94, 95 and 96, and Herculoy 419 and 421, all produced by different companies, and all of which are essentially silicon copper alloys containing small additions of either tin, zinc, or iron.

PB 19514 and 19515. MATTSON, R. L. Effect of shot blasting on the mechanical properties of steel (MA-115). Progress report, Oct 1 - Dec 31, 1942; Final report, Part I, Oct 1, 1942 - Sept 30, 1943. (OSRD Repts 1206 and 3270; War Metallurgy Committee Repts M-40 and M-228) Feb 1943, Feb 1944. PB 19514, 27 p. Price: Microfilm-50¢ - Photostat-$2.00. PB 19515, 113 p. Price: Microfilm-$1.50 - Photostat-$8.00

The first progress report (PB 19514) presents the results of experimental shot peening of machine parts and laboratory specimens to study the effect of shot peening on fatigue durability, impact, dimensions, ballistic limit of armor plate, and stress corrosion cracking, for the period Oct.1 to Dec. 31, 1942 inclusive. The final report summarizes the work of the year, Oct. 1, 1942, to Sept 30, 1943 inclusive, and includes the data presented in the first progress report in order to bring all pertinent information into one cover. The principal observations were: Improvement in fatigue durability in all cases; an indication that harder steels than usual might be used for springs if the process of shot peening is applied; resistance to impact unaffected at room temperature but greatly improved at -60° F. according to limited data; dimensional changes take place, a decrease in the ballistic limit of armor plate on the basis of very limited experiments; and an improvement in resistance to stress corrosion cracking of magnesium alloys. Discussions of shot peening apparatus, measuring apparatus, the type of shot used and general shot peening procedure are included. A section is devoted to an experiment in progress on the effect of shot peening on residual stress. As a result of the work on this project it was decided to use the term "shot peening" instead of "shot blasting" to describe the treatment of metals as distinguished from their cleaning. Shot blasting is the term commonly associated with the cleaning process, while shot peening pertains to the operation of cold working by pelting the surface with small balls or shot. Tables, charts, graphs, photographs, drawings, and diagrams are included. This investigation was carried out at Research Laboratories Division of General Motors Corporation.

PB 20509. MAZIA, JOSEPH and others. Solders, investigation of substitutes for 70 Sn/30 Pb solder used on terne plate ammunition box liners: Third report. (Frankford Arsenal Ordnance Lab Rept R-163). Mar 1942. 20 p. Price: Microfilm-50¢ - Photostats-$2.00

This report records the results which were made of a study of the properties of modified lead-silver solders as substitutes for the 70 Sn/30 Pb alloy used in the manufacture of small arms ammunition box liner M1917, drawing no. 76-6-44. The solders studied were made by adding the following to the lead-silver eutetic alloy: (1) Bismuth, 2 to 30%; (2) antimony, 2 to 12%; (3) bismuth 8%, antimony 8%; (4) bis-

muth 8%, antimony 2%. The solders were investigated with respect to solidification range, shear strength of lap joints on terne plate, shop workability, and wetting characteristics. None of the solders was found to be a satisfactory substitute for the tin-lead solder in present use on small arms ammunition box liners of lap-seam construction. It was recommended that the most promising experimental solders, 90% Pb-Ag eutectic/10% Sb, and 90% Pb-Ag/eutectic 10% Bi, be tried with torch application on liners of lock-joint construction. Of these compositions, the one containing antimony has the following advantages over the one containing bismuth: (1) approximately 20% lower cost; (2) flow point 40°F. lower; and (3) greater strength. It was further recommended that lock-joint liners be soldered with the lap-joint type; and the Pb-Ag eutectic with additions of phosphor-tin be investigated as solder for box liners. Diagrams, tables, curves, and photographs illustrate the report.

PB 20216. ROSENTHAL, D. and others. History of residual stresses in welded ships (NS-305): The use of X-rays for the determination of stresses in ship plates. Progress report. (OSRD Rept 5060; War Metallurgy Committee Rept M-484) May 1945. 36 p. Price: Microfilm-50¢ - Photostat-$3.00
An attempt to adapt the X-ray diffraction method of stress measurement to the determination of average stresses in the steel plate used for the deck of ships is described in this report prepared at the University of California. This investigation was undertaken with the hope that the X-ray method could be used to supplant the trepanning of plugs from the decks of ships since the latter process is a destructive method of testing. The X-ray diffraction method yields values of stress applying to an extremely shallow layer of metal on the surface. Hence the values obtained will reflect any surface distortion due to the rolling of the plate or any similar cause as well as the average stress. Three possible means of correcting the readings for surface effects were investigated. The most promising method appeared to be that of recessing the plate to a depth of approximately 5% of its thickness in order to reduce substantially the superficial stresses. No conclusions could be drawn because the tests of this method were not completed. This method could be applied only where such recesses which normally would be on both sides of the plate are not objectionable or can be repaired satisfactorily. Photographs of testing equipment, drawings, graphs, stress and strain curves, and tabulated data are included.

PB 5703. SACHS, GEORGE and LUBAHN, J. D. Correlation of information available on the fabrication of aluminum alloys: Section V, Formability of aluminum alloys for use in military aircraft: Part III, - Stretch forming of angles with outer leg in tension. Final report, Dec 1944. (OSRD Rept 4626) Jan 1945. 39 p. Price: Microfilm-50¢ - Photostat-$3.00
A preliminary study of the effects of combined bending and tension was made by the use of a "stretching" machine, the rotostretcher, which was developed by the Goodyear Aircraft Corporation of Akron, Ohio. This machine operates on the principle that a part which is bent under conditions of a constant superimposed tension will be strained principally in tension, and any small compressive strains will not result in buckling or wrinkling. The materials tested were the aluminum alloys 2450 and 245T. Detailed descriptions of the experiments and the equipment used, and discussion of results are given. A table, curves showing the results of the stretch forming of angles, and photographs showing diagonal type necks are included.

PB 19550 and PB 19570. SACHS, GEORGE and others. Correlation of information available on the fabrication of aluminum alloys (NA-126): Final report, Section I, Classification and analysis of the forming of various parts. Vol.I, Pb 19550 (OSRD Rept 1673) Jul 1943, 191 p. Price: Microfilm-$2.00 - Photostat-$11.00. Vol. II, PB 19570 (OSRD Rept 3060) Dec 1943, 264 p. Price: Microfilm-$3.00 - Photostat-$16.00.
The introduction to Volume I (PB 19550) explains a suggested system for the classification of aluminum alloy parts based upon the geometrical contour of the finished part and also largely in accordance with the forming methods necessary to attain the desired shapes. The many contours have been classified in eight general types. Analyses of the forming of the first three accompanied by drawings are given in Volume I as follows: 1) Singly curved parts, 2) curved channels, and 3) contoured flanged parts. Volume II contains analyses of the forming of the following types of contours: 4) double curvature smoothly contoured parts, 5) deep recessed parts, 6) shallow recessed parts, 7) minor forming features, and 8) forming of tubing. These analyses are accompanied by drawings illustrating the various contours. Volume II also includes an extensive bibliography on aluminum alloy forming.

PB 19568, 19569. SACHS, GEORGE, and others. Correlation of information available on the fabrication of aluminum alloys (NA-126): Final report, Section II, Examples of fabricating individual parts. Vol. I (OSRD Rept 1674) PB 19569, Jul 1943, 159 p. Price: Microfilm-$2.00 - Photostat-$11.00. Vol II (OSRD Rept 3061), PB 19568, Dec 1943, 212 p. Price: Microfilm-$2.50 - Photostat-$15.00
Descriptions of the actual plant procedures for fabricating forty-two different aluminum alloy parts are given in Volume I and for sixty-two different parts in Volume II. Each volume contains an index of the part types and of the equipment used in their fabrication. These reports were prepared at the Case School of Applied Science.

PB 19567. SACHS, GEORGE. Correlation of information available on the fabrication of aluminum alloys (NA-126): Final report. Section III, Summary, contents and index of Sections I and II. (OSRD Rept 3063) Dec 1943. 46 p. Price: Microfilm-50¢ - Photostat-$4.00
The project on the above subject undertaken at the Case School of Applied Science, originated in the request of the aircraft industry to assemble, correlate and distribute the information available on forming aircraft parts from aluminum alloy sheet. In this report the scope of the work is discussed and a summary of the survey and analysis of fabrication methods is given. Also included are a list of the plants visited, table of contents of Section I (Classification and analysis of the forming of various parts), alphabetical index of Section I, and a classified index of Section II (Examples of fabricating individual parts).

PB 19566. SACHS, GEORGE and others. Correlation of information available on the fabrication of aluminum alloys (NA-126): Final report. Section IV, Survey of the properties of new aluminum alloys: Part I, The aluminum alloy 24ST8-sheet; Part II, The aluminum alloy 24ST8 - extrusions; Part III, The aluminum alloy R301 - sheet. (OSRD Rept 3296) Feb 1944. 186 p. Price: Microfilm-$2.00 - Photostat-$13.00
The designation 24ST8 has been given to the commercial aluminum alloy 24ST when artificially aged at temperatures of 250° to 400° F. Parts I and II of this report prepared by the Case School of Applied Science discuss the properties of this alloy in sheet form and extrusions under the headings: Mechanical properties and metallurgical relations; mechanical properties-design data; physical and chemical properties, production-forming; and corrosion and surface treatment. Part III discusses the aluminum alloy R301-sheet under similar topics. Each part has a bibliography, and also tables and plotted curves showing shear strength, tensile strength, fatigue strength, effect of aging on various properties, typical bearing stress-strain curves for extensions, etc.

PB 19574. SACHS, GEORGE and others. Correlation of information available on the fabrication of aluminum alloys (NA-126): Final report, Section V, Formability of aluminum alloys for use in military aircraft: Part V, Simple bending of rectangular shapes by means of dies. (OSRD Rept 5014) Apr 1945. 60 p. Price: Microfilm-$1.00 - Photostat-$4.00
This is a report of work carried on at Case School of Applied Science on the effects of non-uniform stresses and strains on the forming limit of various metals, particularly of aluminum alloys. In the experiment described herein, rectangular shapes of three aluminum alloys were bent around a cylin-

drical punch. By this process it was possible to investigate the effect of the ratio of the dimensions of the cross section on the forming limit in bending, as well as a number of metallurgical and other minor variables. Considerable specific and general fundamental information was obtained through these experiments and is given in the conclusion of this report. Tables, photographs, and curves are included.

PB 19572. SACHS, GEORGE, and others. Correlation of information available on the fabrication of aluminum alloys (NA-126): Final report. Section V, Formability of aluminum alloys for use in military aircraft: Part VII, Experimental strain analysis of bent rectangular shapes. (OSRD Rept 6305) Oct 1945. 52 p. Price: Microfilm-$1.00 - Photostat-$4.00
The results of experiments in which the conditions of strain existing in bent parts having various ratios of the dimensions of the cross section were analyzed, are presented in this report prepared at the Case School of Applied Science. It is concluded that various conditions of biaxiality ($\varepsilon_2/\varepsilon_1$) between plane stress and plane strain ($\varepsilon_2/\varepsilon_1 = 0$ and $\varepsilon_2/\varepsilon_1 = 0.5$, respectively) can be produced and measured, and fracture without previous necking can be obtained over a wide range of biaxiality by die bending rectangular shapes. For 1/8 in. and 1/2 in. 24S0 sheet and 1/8 in. 24ST sheet the ductility, or fracturing strain, decreases with increasing biaxiality in the region between zero and 0.5. The observed fracturing strains, as a function of biaxiality, relate only to the strain gradient that exists in bending. Theoretical analyses of bending for plane stress and plane strain are in good agreement with actual measurements regarding the circumferential strains at the tension and compression surfaces and regarding the lateral strains, even under conditions of highly non-uniform curvature. Photographs, plotted curves, and a bibliography are included.

PB 19571. SACHS, GEORGE, and others. Correlation of information available on the fabrication of aluminum alloys (NA-126): Final report. Section V, Formability of aluminum alloys for use in military aircraft: Part VIII, Combined bending and tension of rectangular bars. (OSRD Rept 6331) Nov 1945. 46 p. Price: Microfilm-50¢ - Photostat-$4.00
The effects of combined bending and tension in aluminum alloy rectangular bars and sheet, covering as completely as possible the entire range of strain gradients, were studied and the preliminary results presented in this report of experiments carried out at the Case School of Applied Science. Details of the development of equipment for making the tests and measurements are discussed. The tentative conclusions reached are: Strain gradient has no effect on the ductility over a wide range of conditions, and the biaxiality at the tension surface of a curved specimen depends on the curvature and w/h value, not on the strain gradient. The report includes photographs of the equipment, diagrams, tables, and plotted curves.

PB 20621. SILL, DONALD O. The effect of grain size in the head of a brass cartridge case cup on the hardness of the head of the finished case: Second and final report. (Frankford Arsenal Ordnance Lab Rept R-387) Aug 1943. 9 p. Price: Microfilm-50¢ - Photostat-$1.00
Procedures of testing are described. The results of the tests made during this study show that an increase of the grain size of the head of the cal. .30 case cups from 0.090 - 0.120 mm to 0.175 - 0.225 mm has no discernible effect on the hardness of the head of the finished case. Cases made from large grain size cups performed as satisfactorily as cases made from normal grain size cups when fired in the Springfield and Garand rifles, Browning machine gun and the high pressure test gun. On the basis of the above results, it is recommended that the present specification on grain size of cal. .30 cups be broadened thus making acceptable cups more readily available. Tables and photographs are included.

PB 20198. SHELLING, W. A. and SHELLING, W. O. Direct explosion test for welded armor and ship plate: Part II, Prime and welded plate (NS-255) Final report, Sep 1940. (OSRD Rept 6382; War Metallurgy Committee Rept M-622) Dec 1945. 41 p. Price: Microfilm-50¢ - Photostat-$3.00
This report, prepared at the Trojan Powder Company presents the results of investigations in which explosives were developed for the testing of steel plate by the direct explosion method and discusses the use of this test for determining the relative resistance of prime and welded plate to shock. A number of explosives having a wide range of characteristics have been developed and are now available for testing. The constituents and characteristics of some of these explosives are given in tabular form. Photographs showing equipment and cracks in plates are included.

PB 20224. STOUT, R. D. and others. Weldability of steel for hull construction (NS-255): Methods of testing weldability of steel plates and shapes. Progress report, Oct 1944. (OSRD Rept 4544; War Metallurgy Committee Rept M-414) Dec 1944. 13 p. Price: Microfilm-50¢ - Photostat-$1.00
In the investigations presented in this report, specimens from six heats of HTS steel were purchased from five suppliers and subjected to tests for cracking sensitivity at Lehigh University. The following conclusions were reached: 1) Some evidence is given indicating that chemistry on the high side of the specifications leads to greater cracking tendency; 2) position in the ingot showed no significant effect on cracking sensitivity; 3) five heats from five suppliers were found to vary slightly, but reproducibly, in cracking sensitivity; 4) a comparison of electrode types demonstrated definite differences in the cracking levels of E6010, Murex80, and austenitic 19-9 electrodes. A conversion chart for comparing results obtained from unlike plate gauges was prepared. Tabulated results, diagrams, and plotted curves are included. See also PB 20199.

PB 21899. U. S. WAR DEPARTMENT. Foundation steel pedestal base for 73' 7" guyed radio tower. (Tech Manual 11-2615). Jul 1944. 7 p. Price: Microfilm-50¢ - Photostat-$1.00
These are instructions for assembling and setting the foundation steel pedestal base for optional use with the 73-foot, Finch radio antenna tower. This base is used instead of a concrete foundation. Installation drawings are included.

PB 20569. U. S. WAR DEPARTMENT. QUARTERMASTER BOARD. Report of test of bedstead, folding, steel, medical and cot, folding, steel - QMB T-1233. (Project T-184). Nov 1943. 11 p. Price: Microfilm-50¢ - Photostat-$1.00
Tests to determine the comparative durability of experimental types of bed springs, the possible substitution of light weight tubing for standard tubing, and the necessity for fabric support bands were conducted at Camp Lee, Virginia, and are described in this report. The equipment was subjected to normal use in the station hospital and to tests simulating normal use. As a result of the tests, it was recommended that a reduction in the thickness of the tubular ends of the folding steel cot and the folding, steel, medical bedstead, from .070" to .056" and .062" respectively be considered practicable; that the No-Sag type fabric be considered a satisfactory substitute for the standard link-type fabric, and the experimental looped wire fabric be considered unsatisfactory; and that the bands supporting the link-type fabric be considered necessary for comfort. It was further recommended that consideration be given to the possibility of reinforcing the band assembly by increasing the gauge of the spring wire used.

PB 21847. U. S. WAR DEPARTMENT. QUARTERMASTER BOARD. Report of test of peeler-shredder, vegetable. (Project T-134) Mar 1943. 3 p. Price: Microfilm-50¢ - Photostat-$1.00
Tests were made by the Quartermaster Board to determine the comparative speed, economy, and convenience of vegetable peeler-shredders with respect to the paring knives and mechanical potato peelers currently in use. It was concluded that the peeler-shredder is faster, more convenient, and reduces the wastage of potatoes when used instead of the paring knife. The mechanical potato peeler was faster, while the percentage of waste was 22, compared with 21% for the peeler-shredder for the paring knife.

PB 21840. U. S. WAR DEPARTMENT. QUARTERMASTER BOARD. Test of pipe, stove, tent: Final report. (Project T-53) Oct 1942. 4 p. Price: Microfilm - 50¢ - Photostat-$1.00

Procedure and findings of test to determine practicability of a secondary air vent for tent stove pipes are described. It was found that the use of the stove lid to induce secondary drafts reduced fuel consumption, clogging and the amount of smoke produced and offered a means of greater control than any other method of inducing secondary air currents. Thus it was recommended that this method be considered superior to the methods requiring additional fixtures or changes in the design of the tent stove, M-1941.

PB 21839. U. S. WAR DEPARTMENT. QUARTERMASTER BOARD. Test of smoke pipe, enamel coated: Final report. (Project T-102) Feb 1943. 6 p. Price: Microfilm - 50¢ - Photostat - $1.00

Procedure and findings of tests are described. It is recommended that the enamel coated smoke pipe be considered unsatisfactory as a substitute for the standard issue pipe, primarily because of blistering under constant use, and that proper care be afforded standard issue black iron stove pipe by weekly application of regular issue stove polish mixed with lubricating oil. The proportion of the mixture recommended is four packages of stove polish to one pint of lubricating oil.

PB 20200. WILSON, W. M. and others. Cleavage fracture of ship plate as influenced by size effects (NS-336). Final report, Nov 1, 1944 to Aug 31, 1945. (OSRD Rept 6487; War Metallurgy Committee Rept M-614) Jan 1946. 98 p. Price: Microfilm-$1.00 - Photostat-$7.00

This report contains a description of tests made to determine why ship plates crack in service. The tests were based upon the hypothesis that the cracks begin at points where there are severe geometrical stress-raisers and that the tendency for the plates to crack increased, for specified geometrical characteristics, with an increase in the notch-sensitivity of the steel. Plates with widths of 72, 48, 24, and 12 inches and containing severe stress raisers were tested. Information obtained relative to the behavior of wide plates containing severe stress-raisers included static strength; energy-absorbing capacity; relation between Charpy values and the energy-absorbing capacity of wide plates; and the plastic deformation at the ends of the stress-raiser. Plates were subjected to tensile tests at temperatures ranging from minus 73° F. to plus 110° F. It was concluded that the nominal strength of plates of a given steel is affected but slightly by changes in temperature from -40° F. to + 90° F.; the nominal strength is affected but slightly by changes from shear to cleavage and is only 10% to 20% greater than the coupon yield point of the steel. The nominal strength is not greatly affected by the ratio of the length of stress-raiser to width of plate. Other conclusions are given and results are discussed in this report prepared at the University of Illinois. Typical experimental data from wide plate tests are given in Appendix A. A report of Charpy v-notch impact tests is included in Appendix B. Photographs of testing machines and specimens tested, plotted curves, photomicrographs, and tabulated data are given.

ORDNANCE AND ACCESSORIES

British

PB 20731. WALKER, H. W. Fundamental factors relating to smoke screens with tables from the British data. (Edgewood Arsenal Chemical Div Rept 193). Jun 1922. 26 p. Price: Microfilm-50¢ - Photostat-$2.00

An attempt is made in this report to tabulate all the available British data on their standard smoke generating materials in such a manner that they will be readily available for comparison and correlation with data obtained from Edgewood Arsenal tests; and to derive, if possible, quantitative comparative values for each of the various type materials. Sources of information, theory, description of smoke generating apparatus and materials and conclusions make up the report. Graphs, tables, and bibliography are attached.

German

PB 22389. BARTHOLOMEW, E. L., JR. and others. Examination of enemy material (OD-113; AC-77; M-119): Metallurgical investigation of German 150 mm. gun tube. Progress report 103, Nov 10, 1944. (OSRD Rept 4464). Dec 1944. 18 p. Price: Microfilm-50¢ - Photostat-$2.00

This report, prepared at Massachusetts Institute of Technology, describes the examination of a small section of a 150 mm. German gun tube to determine its method of manufacture, chemical composition, and metallurgical and mechanical properties. The steel used was relatively high in chromium and molybdenum. The tube was a forging with low strength, and good impact properties. A discussion of the procedure of examination is followed by tables giving the markings found on the gun, chemical composition of the samples, hardness survey, tensile properties, and V-notch Charpy impact tests. Photographs, drawings, curves and photomicrographs are included.

PB 22951. BROOKS, C. H. and others. Nitroguanidine - manufacture and use in German propellants and high explosive shells. (Naval Tech Mission in Europe Tech Rept 261-45). Oct 1945. 21 p. Price: Microfilm-50¢ - Photostat-$2.00

This report covers three general phases of nitroguanidine: (1) manufacture; (2) use in propellants; and (3) use as a high explosive. The information on manufacture was obtained mainly from Dr. Walter Schnurr of Dynamit A.G. (a translation of Dr. Schnurr's description of recrystallization of crude nitroguanidine appears in appendix A); on nitroguanidine propellants from Dr. Schnurr and others: and on high explosives loads from Dr. Morhardt of CPVA at Danisch-Nienhof. Photographs and table of cannon powder composition and ballistic values for NQ powder are appended.

PB 16334. GERMANY. MARINEWERFT, WILHELMSHAVEN. Stückliste der nebel-anlagen auf torpedobooten ohne torpedoarmierung. (Inventory of the smoke screen equipment on torpedo boats without torpedo armament). (Enlargement print of part of microfilm 41-1) Oct 1933. 14 p. Price: Microfilm-50¢ - Photostat-$1.00

This document is in German.

PB 22331. GRENELL, L. H. and others. Examination of enemy materiel: Metallurgical examination of a German 7.62 cm A.P. w/tungsten carbide short case (Russian) shot. Progress report 169, Mar 31, 1945. (OSRD Rept 5048). May 1945. 9 p. Price: Microfilm-50¢ - Photostat-$1.00

The projectile body was forged from a W.D. 1080 steel, and the inner steel casing was machined from W.D. 1070 bar stock. Both steels were in the annealed condition. The projectile was equipped with the early type of bimetal, copper-steel, rotating band. The plastic section of the projectile was molded from a fiber-filled phenolic resin. A nominal deep drawing (70-30) type brass was used for the cartridge case. The tungsten carbide slug appeared to be hot pressed from tungsten, carbon, and a small amount of nickel binder. The density and hardness of the slug were high. These properties would be desirable for this application, but would not be suitable for machine tools. A small amount of binder gives a carbide compact with a low transverse strength, and subsequently results in a weak tool. The projectile, with the exception of the carbide slug, was sectioned, photographed, assembled, and disassembled as shown in photographs. A micrograph of the tungsten carbide core and tables of data resulting from chemical analysis and from microscopic and macroscopic examination are included.

PB 22373. GRENELL, L. H. and others. Examination of enemy materiel (OD-113; AC-77): Metallurgical examination of a German MG-42, 7.92 mm machine gun. Progress report 119, Sep 7, 1944. (OSRD Rept 4358. War Metallurgy Committee Rept M-403). Nov 1944. 12 p. Price: Microfilm-50¢ - Photostat-$1.00

Examination of this machine gun at Battelle Memorial Institute revealed that it was fabricated in 1943 from alloy and plain carbon steels with a few parts of plastic. For the most part,

the steels were produced by the basic open hearth process with silicon deoxidation. However, the majority of sheet stampings were of the "rimmed-steel" type. The use of alloy steels, which approximated SAE 3400 and 4800 steels, was kept to a minimum. Residuals with respect to copper and chromium were a little high. A breakdown of the fabrication methods showed 37 stampings, 23 wire parts, 2 tubing parts, 3 forgings, 3 plastic parts, and 57 different parts machined from barstock. Brief discussions of economic considerations relative to manufacturing; photographs; and tabulated data are included.

PB 5167. HICKAM, JOHN B. Protection afforded by the flak curtain against the German 20 mm. HE projectile. (AAF ATSC Memo Rept ENG-49-697-IM) Jul 1944. 10 p. Price: Microfilm-50¢ - Photostat-$1.00
The purpose of this memorandum report is to describe experiments to determine (1) the degree of protection afforded by the flak curtain against the German 20 mm. HE projectile; and (2) the relation of spacing between fuselage skin and flak curtain to protective efficiency of the curtain. The projectile and its action is described, the placing of the Grow flak suit in relation to the flak curtain is discussed, and the method of the firing test is explained. Both front and rear view of curtains and vests, after firing, are shown in six photographs. It is recommended that the flak curtain be constructed of plates measuring 6 x 12 or 8 x 16 inches, that the strength of the binding material be increased, and that the thickness of the armor plated be doubled wherever the weight can be afforded.

PB 4577. LARSON, LESLIE L. German creped paper protective cover. (CWS. Captured Material Tech Rept 21). Aug 1943. 5 p. Price: Microfilm-50¢ - Photostat-$1.00
The German paper protective cover would be used in the field as an antispray garment or ground sheet to protect against vesicants. A description of the subject item indicates that the protective cover would be less suitable than the U.S. cellophane cover.

PB 16667. PRATT, CARL D. High explosives: Some notes on German high explosive filling practice and experience. Tenth partial report. (CIOS Progress Rept 40) Jun 1945. 8 p. Price: Microfilm-50¢ - Photostat-$1.00
This report gives some German high explosive filling practice and experience for large and small items of ammunition. It is accompanied by two tables of compositions.

PB 4574. RINEHART, C. A. and SIEGEL, B. German drum type PTL-41 horse mask canister. (CWS Captured Materiel Tech Rept 24). Oct 1943. 10 p. Price: Microfilm-50¢ - Photostat-$1.00
The German canister, for use on a horse gas mask, is much smaller than the U.S. equivalent, and the protection offered against CG, CC and AC by the German canister is about one-fifth that given by the U.S. canister. A description of the physical and functional characteristics is included with photographs.

PB 16671. WELLSCHMIED, F. Measurement of acceleration and vibration. (FIAT Final Rept 642) Jan 1946. 9 p. Price: Microfilm-50¢ - Photostat-$1.00
A brief qualitative description of the accelerometer developed by Wellschmied for use in A4 (V-2) rockets. This is of value only to indicate the principles involved, and is without details on either theory or design. As evaluated by Dr. H. P. Robertson it is not deemed of sufficient importance for reproduction and large dissemination. In German.

Italian

PB 4569. LARSON, LESLIE L. Italian antigas glove and antigas trousers. (CWS Captured Materiel Tech Rept 29). Oct 1943. 7 p. Price: Microfilm-50¢ - Photostat-$1.00
This is a technical report which describes the physical characteristics, functional characteristics, and tactical use of Italian antigas glove and antigas trousers. One photograph showing an individual wearing glove and trousers is included. Considered as a whole, the Italian antigas clothing would be less suitable than comparable U.S. equipment.

PB 4570. LARSON, LESLIE L. Italian decontamination boots. (CWS Captured Materiel Tech Rept 28) Jun 1943. 8 p. Price: Microfilm-50¢ - Photostat-$1.00
This technical report describes British decontamination boots (originally reported as captured Italian equipment) as shown in the photograph attached. The physical characteristics, functional characteristics, and tactical use of the boots are described. The U.S. civilian decontamination boots are similar, have better liquid-H resistance in the "as received" condition, and are generally superior in all other respects except the soles which do not wear well, especially under wet conditions.

PB 4567. MILES, GEORGE E. Candelotto fumogena and fumo bianca: Italian smoke candles. (CWS Captured Materiel Tech Rept 31) Oct 1943. 8 p. Price: Microfilm-50¢ - Photostat-$1.00
The items examined in this report consisted of two similar Italian smoke candles, both containing white smoke mixes of the Berger type. A complete description of the candles is given with directions for use and compositions of the smoke mix and the starter pellets. The burning characteristics of these candles were not determined as only one sample of each was received. Tactical use, comparison with comparable U.S. equipment, and recommendations complete the report. Two photographs showing components of this munition are included.

PB 4552. MILES, GEORGE E. "Fumata da Segnalazione", Italian colored smoke signals: Green, orange, red, violet, and white; cardboard case. (CWS Captured Materiel Tech Rept 47) Jan 1944. 13 p. Price: Microfilm-50¢ - Photostat-$1.00
The items examined consisted of 5 types of Italian smoke signals in cardboard boxes, with labels in both Italian and German. The physical characteristics are discussed and composition identified for all 5 colors. One photograph showing components of these munitions, and one photograph showing functioning of the "Fumata da Segnalazione Bianca" in comparison with white smoke grenade M18 is included. It is recommended that the smoke signals, with the exception of the orange smoke, not be used as substitutes for M16 or M18 grenades due to the possibility of the colors being confused.

PB 4572. RINEHART, C. A. Italian civilian gas mask, model P.C. 38. (CWS Captured Materiel Tech Rept 26) Oct 1943. 12 p. Price: Microfilm-50¢ - Photostat-$1.00
This Italian gas mask, P.C. 38, consists of a rubber facepiece, canister, special practice airplug and anti-dim tube, and is contained in a cloth bag inside a cardboard box. All items are described in detail. The canister contains two absorbents; tests were conducted on both absorbents and results are given. Comparison with comparable U.S. equipment completes the report. Photostatic prints with instructions for use are included.

PB 4558. ROSE, EUGENE L. and READY, DANIEL. Italian glass ampoules of agents for training purposes. (CWS Captured Materiel Tech Rept 41) Dec 1943. 10 p. Price: Microfilm-50¢ - Photostat-$1.00
This report describes Italian glass ampoules labeled as containing chemical agents. These ampoules were in two sizes, small and large as shown in two photographs attached. A complete description is given of these vials, and chemical analyses of their contents. It is recommended that the use of miniature ampoules for training small units be incorporated in the U.S. program.

Japanese

PB 17632. ABBOTT, H. L. Japanese 6 meter base height finder for use with 15 cm AA gun. (Japanese Ordnance Equipment). (Ordnance Technical Intelligence Rept 126) 1945. 5 p. Price: Microfilm-50¢ - Photostat-$1.00

this Japanese 6 meter Experimental Height Finder was designed for use with the 15 cm AA Gun. Two models were planned. The Model 1 (item on hand) was generally planned on the Japanese Type 90 3 meter height finder. 1-1/2 meters was added to each end of the instrument and an internal adjustment system was added. The Model 11 was supposed to have been patterned after a United States Army 13½ foot Height Finder, made by Keuffle and Esser, which the Japanese captured in the Philippine Islands. The optical system is basicly the same as the K & E. Data obtained from the Japanese indicate that the Model 1 instrument was too difficult to manufacture and adjust one reason being that two of the measuring wedges were displaced in opposite ends of the instrument. No tripod or cradle was found with height finder. Two blue prints are available. Two photographs and four drawings accompany the report.

PB 17525. ABBOTT, H. L. and GRUBBS, ROBERT. Japanese "Keki" type A. A. director and fire control equipment for type 2,20 mm mobile A. A. cannon. (Ordnance Tech Intelligence Rept 127) Dec 1945. 12 p. Price: Microfilm-50¢ - Photostat-$1.00
The report contains full information on: I. Director (type 98 - Navy). II. Gun (type 2,20 mm mobile A. A. cannon on a new mount with a new traveling carriage). III. On carriage equipment (gun). (The on-carriage fire control equipment consists of the computing sight, remote control system, and firing solenoid). IV. Generators (these are housed in a 4-wheel enclosed trailer. The main switching panel and voltage rheostats are also located there. Eleven photographs of the equipment and a schematic wiring diagram are attached to the report.

PB 17524. FIORE, J. M. Japanese type 5 tank gun (experimental). (Ordnance Tech Intelligence Rept 144) Jan 1946. 3 p. Price: Microfilm-50¢ - Photostat-$1.00
This is a high velocity weapon designed to be mounted on the Chito tank. The tube is of the built-up type, recoils in a sleeve type cradle, and has the same characteristics as that of the type 4, 75 mm AA gun. The breechlock is of the horizontal sliding type, and is semi-automatic in operation. This gun uses a hydro-spring type of recoil system, the recoil cylinder being located on the upper left side of the barrel, and the recuperator cylinder on the upper right side of the barrel. Both elevating and traversing handwheels are located on the left side of the gun and the firing mechanism is the push-button type, located on the elevating handwheel. The gun does not have any equilibrators, and in order to compensate for muzzle preponderance, it uses a counterbalancing weight at the breech end of the gun. Four photographs accompany the report.

PB 17526. FIORE, J. M. and others. Japanese type 96, 150mm mortar. (Ordnance Tech Intelligence Rept 139) Jan 1946. 8 p. Price: Microfilm-50¢ - Photostat-$1.00
This mortar is a smooth-bore muzzle loading weapon, featuring a recoil mechanism. It is transported in two loads. The baseplate and bipod are carried in a special cart. The mortar and recoil mechanism are mounted on two wheels. The two loads may be manually drawn for short distances. Normally each load is drawn by one horse. The mortar was patterned from the French Brandt type, and was quite satisfactory in operation, especially in regard to stability and functioning of the recoil mechanism. Only 50 were manufactured because its weight was considered excessive and its manufacture too expensive and difficult. This mortar, Type 96, was replaced by the 150 mm mortar, type 97, which gave the same range, had less, but still satisfactory stability and whose weight was 47% of that of the type 96 mortar. The report is accompanied by 5 photographs and 2 diagrams.

PB 22377. GRENELL, L. H. and others. Examination of enemy materiel (OD-113; AC-77): Japanese drift meter or bomb sight. Progress report 132, Oct 10, 1944. (OSRD Rept 4365. War Metallurgy Committee Rept M-416). Nov 1944. 15 p. Price: Microfilm-50¢ - Photostat-$1.00
Examination of this Japanese optical instrument at Battelle Memorial Institute showed that the materials were predominately brass with some aluminum and steel such as might have been chosen by a standard optical equipment maker of any country. The entire group of parts seemed to have been handmade and fitted into this individual instrument. The brass and steel parts along the line of sight were chemically darkened. On the aluminum, layout dye was used. The instrument is evidently the product of a shop without elaborate equipment and no effort to change design toward high production was noted. Discussion of the findings, photographs and tabulated data are included.

PB 22384. GRENELL, L. H. and others. Examination of enemy materiel (OD-113; AC-77; N-119): Metallurgical examination of a Japanese bomb hoist and release. Progress report 136, Oct 30, 1944. (OSRD Rept 4423. War Metallurgy Committee Rept M-428). Dec 1944. 12 p. Price: Microfilm-50¢ - Photostat-$1.00
This report covers the examination at Battelle Memorial Institute of each part of the subject equipment for details of fabrication, treatment, type of material, workmanship, and methods of corrosion prevention. Steel, aluminum, and bronze were used in the manufacture of the bomb hoist and release. A majority of the steels used were plain carbon, but the important parts were of Ni-Cr or Cr-Mo steels. Aluminum alloys were similar to those produced in this country and the bronzes were mainly alloys containing aluminum. Metal stampings were used extensively. Twenty-five per cent of the parts were cut and formed from sheet. Most of the machined and forged steel parts were coated with a thin cadmium plate for protection against corrosion, and parts of the steel sheet were protected by an ordinary phenolic varnish with carbon-black pigment applied over an iron-oxide primer. Additional findings and economic considerations are discussed. Photographs and tabulated data are included.

PB 22333. GRENELL, L. H. and others. Examination of enemy materiel (OD-113; AC-77; N-119): Metallurgical examination of a Japanese 57 mm tank gun, model 97. Progress report 172, Apr 16, 1945. (OSRD Rept 5104; War Metallurgy Committee Rept M-521). May 1945. 30 p. Price: Microfilm-50¢ - Photostat-$2.00
In the production of the 57 mm tank gun, 128 of the parts were fabricated from steel and 15 from copper-base alloys. Ten of the ferrous parts were of alloy steel of the SAE 3436 (Navy 46 84h Gr. W), SAE 3150, and SAE 2340 (Navy 46 84 Gr. V) types, and the rest were made from plain carbon steel. The steels were generally clean and were produced in basic electric or open-hearth furnaces with silicon, aluminum, and/or titanium as deoxidizer. The presence of occasional high residual amounts of nickel, chromium, and tin suggested the use of large percentages of scrap in the furnace charges. Conventional methods of fabrication, such as forging, machining and casting were used in producing this gun. The barrel, breech ring and breech block yielded the usual tensile properties for these steels at the respective hardness levels; the properties of the barrel at various positions were particularly uniform. V-notch Charpy impact test results on these parts were high at room temperature and decreased normally as the temperature of testing was lowered. The impact test bar fractures changed from fibrous to completely crystalline at the testing temperature of -20° F. Jominy hardenability tests on the barrel indicated good hardenability and, further, that a quenching temperature of 1650° F. yielded maximum hardenability. Drawings, photographs and tables are included.

PB 22386. GRENELL, L. H. and others. Examination of enemy materiel (OD-113; AC-77; N-119): Metallurgical examination of two Japanese mechanical impact fuses and containers. Progress report 142, Nov 7, 1944. (OSRD Rept 4454. War Metallurgy Committee Rept M-436). Dec 1944. 9 p. Price: Microfilm-50¢ - Photostat-$1.00
These fuses when received at Battelle Memorial Institute for examination were packed in their original containers which were single-lap soldered tin cans. The cans were made from heavy steel sheet, possibly electrotinned, fused, and lacquered. The fuse parts were made from various types of brass machined from extruded bar, except for the striker and creep

spring which were made of steel. Both are mechanical-impact type fuses, although the delay mechanism is different. Discussion of economic considerations involved in manufacture and findings of the examination are presented. Included also are chemical analyses of the three types of alloys in the brass parts, photographs, and tabulated data giving detailed information on the fuses.

PB 22393. GRENELL, L. H. and others. Examination of enemy materiel (CD-113; AC-77; M-119): Metallurgical examination of two Japanese Oerlikon-type 20 mm. aircraft machine guns of 1944. Progress report 173, Apr 20, 1945. (OSRD Rept 5134. War Metallurgy Committee Rept M-533). May 1945. 33 p. Price: Microfilm-50¢ - Photostat-$3.00
Examination of these two machine guns at Battelle Memorial Institute showed that about 60% of the parts of each gun and nearly all of each weapon on a weight basis were constructed of nickel-chromium steel similar to the SAE 33XX and 34XX analyses. Many of the larger pieces had as much as 0.40% molybdenum also. The important springs were made of silicon-manganese steel equivalent to SAE 9260. In general, fabrication methods and materials used in the manufacture of these guns in 1944 were very similar to those used in the same guns in 1941. Discussion of the findings of the metallurgical examination and of economic considerations in the manufacture of this equipment, photographs and tabulated data are included.

PB 20652. MILES, GEORGE H. Japanese lachrymatory smoke candle, type "163K" and type "165K", green band. (CWS Captured Materiel Memo Rept 6) Oct 1943. 4 p. Price: Microfilm-50¢ - Photostat-$1.00
This type of munition containing a mixture of CN (chloracetophenone) and cellulose nitrate consisted of a dark grey painted can with a friction cover, 2 7/16 in. in diameter and 7½ in. in height, provided with a wood scratcher block and match head ignition system. This report gives a comparison of this munition and the previously reported types, 162K and 136K.

PB 17523. WARDEN, K. L., JR. Japanese Experimental 10 cm "Winged Bullet". (Ordnance Tech Intelligence Rept 124) Jan 1946. 3 p. Price: Microfilm-50¢ - Photostat-$1.00
This round was to be used in the 10 cm "non-rifling gun" but the initial work was unsuccessful because the fin was sheared on firing. The projectile is somewhat similar in appearance to the U. S. 4.5" rocket which is fired from aircraft. The propellant was bound into the fins as in mortar shell. The Japanese state that no fuse was developed for this round and none have been found to date. However, the threads in the nose of the projectile will take a fuse which is similar to the type 100 mortar fuse. All rounds recovered were sand loaded. This round had not been put into production. None of the weapons which fired this round have been found. The complete round is made up of two parts; the fins and a connecting rod welded to them, and the projectile. The overall length of the round is 53-5/8" and the length of the projectile is 24-3/4". An auxiliary section 11-5/8" long can be added to the projectile to increase its size. On some of the samples recovered, there was a bourrelet with eight bearing surfaces in the middle of the round.

United States

PB 20656. ADAMS, J. R. and others. Test of the M74 incendiary bomb in M48 aimable cluster. (Dugway Proving Ground Special Rept 36). Sep 1944. 67 p. Price: Microfilm-$1.00 - Photostat-$5.00
The object of the work reported was to determine: 1. the ballistic and dispersion characteristics of the 500-lb. aimable cluster M48 (containing 38 bombs, chemical, 10-lb. M74, PT1 filled), and 2. the fire raising ability of the bomb, chemical, 10-lb. M74, PT1 filled, in light structures. The ballistic characteristics of the M48 are satisfactory for operational use but should be studied for possible further improvement. Direct hits of the PT1-filled M74 bomb which penetrate into light structures produce rapidly spreading appliance type fires. The M74 bombs function in such manner as to be effective in one story light structures. Tables appear in the report while photographs, dispersion patterns and bombardier's report make up the appendices.

PB 21138. BARBER-COLMAN COMPANY, ROCKFORD, ILLINOIS. M5A1E1 modification of the M5 or M5A1 director for intermediate calibre A. A. guns. (OSRD Rept 1764; NDRC Rept 7.44). Jul 1943. 32 p. Price: Microfilm-50¢ - Photostat-$3.00
This report contains a description and operating instructions for a field modification of the M5 or M5A1 director. The director, as modified, is supplied with range from a thirty-inch range finder of the superimposed coincidence; two-color, autocollimated type. To facilitate range tracking, the range finder incorporates a height-to-range converter. A range finder operator matches target altitude instead of slant range, slant range being fed into the range finder and by a servo-mechanism to the director. A second eyepiece on the range-finder allows spotting by an independent observer. A design study of a possible field modification to spot directly in azimuth and elevation instead of in range is being carried on under this contract. The appendix contains photographs and diagrams.

PB 20350. BECKER, ROBERT L. Synchronization of two or more caliber .50 guns. (AAF ATSC Memo Rept ENG-53-553-611) Apr 1944. 4 p. Price: Microfilm - 50¢ - Photostat - $1.00
Report on the development of gun synchronization designed to be used with electrically fired guns installed in the turrets. Criticism of the Dutch system of Lt. den Ouden is followed by a description of gun synchronization as developed by the Armament Laboratory to eliminate all of the former defects. However oscillograph records disclose that synchronization has reduced the cyclic rate from 706 to 571 rounds per minute. Dispersion patterns are greatly reduced in size by synchronization; thus if the sight is properly harmonized on the center of impact it is possible that the increased number of hits may offset the reduction in the rate of fire. Further development to increase rate of fire, followed by tests at Eglin Field, is recommended.

PB 20619. BOLSTAD, ERLING. Investigation of copper spheres for the determination of chamber pressures. First report. (Frankford Arsenal Ordnance Lab Rept R-237) Oct 1942. 28 p. Price: Microfilm-50¢ - Photostat-$2.00
Compression tests were run on five sizes of annealed copper spheres, viz., 3/16, 1/4, 5/16, 3/8 and 7/16 inch diameters. Load-strain curves are essentially straight line relationships over the range investigated. Extreme variation of sets under load are much less than commonly experienced with copper cylinders. Firing tests conducted on .30, .45 and .50 caliber ammunition showed that satisfactory pressure determinations can be made using spheres instead of cylinders. Spheres can be manufactured to practically any tolerance by mass production methods and are therefore less expensive than cylinders. It is recommended that spheres replace cylinders for pressure determinations of small arms ammunition. References, tables and graphs are included.

PB 20694. BROWN, S. F. The development of the 8 ounce smoke bomb, mark I. (Edgewood Arsenal Chemical Div Rept 243). Jan 1923. 30 p. Price: Microfilm-50¢ - Photostat-$2.00
The development of this bomb was undertaken with the object of producing a bomb which would function satisfactorily when used for marking purposes. This involved the inspection of bombs previously loaded which had deteriorated during storage and the preparation of a new bomb which would not only function satisfactorily but would, also, be stable under storage. This report covers the development of such a bomb.

PB 22038. BRUCE, JOHN M. Field filling apparatus. (CWS Tech Div Memo Rept 742). Oct 1943. 29 p. Price: Microfilm-50¢ - Photostat-$2.00

The object of the work described in this report was to develop an improved field filling apparatus for chemical warfare agents mounted on chemical service truck M1. Development was completed on the following apparatus: land mine filling apparatus, adjustable wrench for the removal and replacement of land mine screw covers, hoisting beam and truck attachment brackets for hoisting loads to a higher elevation than possible with the present truck hoist. Development of flexible metallic filling lines led to the finding of a polymer plastic which successfully resisted chemical agents. However, it has not been possible to make a satisfactory liquid tight seam with this material. The report contains historical, theoretical, and experimental data followed by discussion, conclusions, and recommendations. Diagram and photographs appear in the appendix. Bibliography is given.

PB 17088. DEWEY, BRADLEY, JR. and CARSON, J. S. Gelation of solutions of GR-S Synthetic rubber in straight run gasoline by low temperature vulcanizing agents. (CWS Tech Div Memo Rept 973) Jan 1945. 14 p. Price: Microfilm-30¢ - Photostat-$1.00
It is concluded that gasoline can be thickened, for use in incendiary munitions, by vulcanization of a gasoline solution of GR-S with benzoyl peroxide in presence of accelerators. It is concluded that gasoline cannot be thickened satisfactorily for use in incendiary munitions by vulcanization of a gasoline solution of GR-S by the addition of sulfur and ultra-accelerators.

PB 19788. DU PONT, E. I. DE NEMOURS AND COMPANY. Thermochemical studies of special propellants. (OSRD Rept 6217). Jan 1946. 25 p. Price: Microfilm-50¢ - Photostat-$2.00
The report describes an apparatus and technique for obtaining heats of explosion and composition of gas from a burning propellant. From these experimental data, the rational heats and flame temperatures of various compositions have been calculated. Performance of propellants can then be predicted. Descriptions of the calorimeter bomb, water calorimeter, gas measurement and procedures are given. Tables and diagrams accompany.

PB 20633. EHRENFELD, DAY and WALLIS, C. H. Report on field tests to determine persistence of thermally dispersed C.W. (Edgewood Arsenal Chemical Div Rept 260) Feb 1923. 9 p. Price: Microfilm-50¢ - Photostat-$1.00
Two tests were made: the first, in a specially constructed wind tunnel in order to control the concentration for a known distance; the second, in a woods in which there was considerable underbrush in order to have conditions that especially favored persistence. Conclusions are that 1- in open country it is possible to send troops over territory gassed with CN (chloracetophenone) without lachrymation within few minutes after the cloud has passed, and 2 - in woods with dense underbrush, about two hours are required. Tables of distances, duration and concentration, together with method of calculation of concentration are presented.

PB 4403. GILBERT, LLOYD O. The effect of water rinsing on the subsequent formation of phosphate coatings. (Rock Island Arsenal Lab Rept 45-1286). Mar 1945. 15 p. Price: Microfilm-50¢ - Photostat-$1.00
Water rinsing after sandblasting and prior to phosphating produces effects contributing to lower corrosion resistance, reduced oil absorption characteristics and irregularity of the phosphate coating. Preheating parts in boiling water prior to phosphating results in reduction in coating weight of approximately 35%. Where corrosion resistance of the coating is of primary importance it is recommended that no rinse be used prior to phosphating. Photomicrographs illustrate the report.

PB 20657. GUTHMANN, W. S. and COX, G. L. Comparative screening value of E-5 and M47A2 bombs filled with WP. (Dugway Proving Ground Special Rept 12). Aug 1943. 31 p. Price: Microfilm-50¢ - Photostat-$3.00
In the four tests conducted to compare the screening efficiency of 100-lb. and 500-lb. clusters of WP (white phosphorus) filled E5 bombs, with the screening efficiency of M47A2 bombs carrying an equivalent amount of WP, the clusters of E5 bombs were superior in all cases to the M47A2 in setting up a smoke screen. Comparative tests indicated that very similar results were obtained when a single 500-lb. cluster of E5 bombs was dropped and when four 100-lb clusters were dropped at 100-yard intervals. A tabular comparison of each munition is given in the report, and photographs are appended to show the relative screening efficiency of the two munitions under different meteorological conditions. Target diagrams are also appended.

PB 18874. HALVERSON, H. R. The effect of air burst on the blast from bombs and small charges: II Analysis of experimental results. (OSRD Rept 4899; NDRC Rept A-320). Apr 1945. 62 p. Price: Microfilm-$1.00 - Photostat-$5.00
The experimental study of the effect of air burst was reported in an earlier report (OSRD-4246). In the present report, an empirical method of analyzing and extending these data has been developed by expressing the data in terms of the angular variables of the theory of oblique, regular reflection. In the first section of this report, the geometry of the Mach reflection phenomenon has been studied with particular reference to the path followed by the triple point. An empirical curve was drawn from which it is possible to express the height of the triple point as a function of the horizontal distance from the charge for any charge height and for any charge weight. A study of the time interval at many gauge positions between the incident and reflected shocks gave necessary information for drawing this curve. High-speed motion pictures of shocks from 500-pound general purpose bombs in which the Mach configuration could be seen were also used. In the second section the pressure data are analyzed in a similar manner, and predictions are made as to the pressure distribution with charge height at gauge positions not studied experimentally. In the third section the relation is studied between the charge height to maximize the pressure or impulse at a given gauge and the charge height which causes the triple point to pass through that gauge position. From this correlation and by use of the results of the first section, the optimum charge height for pressure or impulse can be determined. The empirical analysis of shock-wave reflection phenomena reported here represents satisfactorily the nature of the blast waves from air or groundburst charges for conditions previously investigated experimentally. It is believed that this work should constitute a significant contribution toward the efficient use of the enhanced blast effect of air burst bombs under appropriate circumstances. Curves, tables and photographs illustrate the report. There is a bibliography of 13 items, all but five of them OSRD reports. This is a progress report under contract with the Woods Hole Oceanographic Institution.

PB 20699. HIME, T. B. Aeroplane spraying. (Edgewood Arsenal Chemical Div Rept 149). May 1922. 19 p. Price: Microfilm-50¢ - Photostat-$2.00
This report describes experimental work with simulated mustard gas B, which has the same density, viscosity, surface tension and vapor pressure as mustard gas itself, to establish the rate of fall, rate of evaporation and optimum size of droplets in airplane spraying. Theoretical calculations indicate that drops 1 mm. or larger will show little loss of mustard due to evaporation and that drops this size will be produced when mustard falls in a wind of less than 20 m.p.h. A spraying apparatus to eject water backward from the plane with the same velocity as the airplane (85 m.p.h.), thus permitting the liquid to fall freely in almost no wind, was successful but needed more developing and testing. A discussion of the tests is followed by photographs, drawings, and a graph.

PB 20626. HIME, T. B. A smoke cloud to screen against aeroplane observations. (Edgewood Arsenal Chemical Div Rept 248). Mar 1923. 22 p. Price: Microfilm-50¢ - Photostat-$2.00
Report of a field test to determine the extent of territory which can be screened from aeroplane observation by a given weight of phosphorus under given wind conditions, and to get

some idea of the best method of distribution of the smoke generators. Smoke was generated by 540 six lb. white phosphorus smoke candles over a 1000-yard front. A complete description is given of the test in which it was attempted to maintain a consumption rate of 10 pounds per minute of phosphorus over the front for each mile per hour of wind velocity. The test was successful on the whole but further tests under other conditions are recommended before results can be conclusive. Photographs, tables and graphs are included.

PB 20581. HINE, T. B. Field test of D. M. candles. (Edgewood Arsenal Chemical Div Rept 76) Oct 1921. 21 p. Price: Microfilm-50¢ - Photostat-$2.00
The principle object of this test was to compare three types of D.M. (Adamsite or diphenylamine chlorarsine) candles as regards penetrating power under field conditions. The candles tested were the Daisite or Type ZE candle, the Tolman D.M. candle and the two compartment or Type ZF candle. The penetration obtained is summarized in a table, and the report is illustrated with photographs and drawings.

PB 4423. HOLLOMON, JOHN H. and JAFFE, L. D. The hardenability concept. (Watertown Arsenal Lab Rept 310/47) Apr 1945. 18 p. Price: Microfilm-50¢ - Photostat-$2.00
An analysis of the nature of the decomposition of austenite and of the effects of the alloying elements on the rates of bainite and pearlite transformation indicates that in some cases pearlite and in others bainite will limit the formation of martensite on continuous cooling. Since alloying elements may have different effects upon the bainite reaction than upon the pearlite reaction, it is necessary to consider two hardenabilities: the pearlitic and the bainitic. If pearlite restricts the formation of martensite on continuous cooling, the pearlitic hardenability is less than the bainitic, and vice versa. It is not known if earlier data applied to pearlitic or bainitic hardenability but it can be deduced that in most cases the data apply to pearlitic hardenability. In order to determine the effects of the alloying elements on the bainitic hardenability, the alloying elements should be added to steels for which bainite limits the formation of martensite. A tentative system is suggested as an interim measure to permit very rough estimates of the bainitic hardenability. Hardenabilities calculated by this system for a number of steels have been found to check well with the measured hardenabilities. Increases in grain size and in molybdenum content do appear to increase the bainitic hardenability somewhat, but the extent of the effect is not known. Tables, curves, and a bibliography are appended to the report.

PB 20508. JAMIESON, A. L. and CROFT, H. P. A study of some variables in mercurous nitrate test: Fourth partial report. (Frankford Arsenal Ordnance Lab Rept 32-C) Oct 1940. 16 p. Price: Microfilm-50¢ - Photostat-$2.00
This report is part of a general study of the mercurous nitrate test used to detect excess stresses which when present in certain copper alloys, may cause season cracks. Since 1926, Frankford Arsenal has been using the mercury cracking test for detecting stresses which will cause season cracking of small arms cartridges. However, the correlation of the mercury cracking tests and surveillance tests results have not been as close as might be desired. Therefore, this investigation was conducted to determine the influence of variables which exist in the mercury cracking test and to eliminate as many of these variables as is possible. The investigation conducted so far has shown that the method of cleaning a specimen has an appreciable effect on the time required for a standard specimen to crack in mercurous nitrate solution. Graphs are included.

PB 22099. KENT, R. H. Rǒggla's equation and its application to interior ballistic problems. (Aberdeen Proving Ground Ballistic Res Lab Rept 48) Apr 1936. 13 p. Price: Microfilm-50¢ - Photostat-$1.00
This report is concerned with the applications that may be made of the series of interior ballistic charts which were published by Edmund Rǒggla in 1930, under the title "Neue diagramme für die angewandte innere ballistik, theorie und beispiele". The pamphlet accompanying these charts explained the method of computing velocities and pressures. While these charts have a useful field of application, the theoretical treatment of Rǒggla may also be used advantageously in calculating, without their aid, the performance of a new weapon when interior ballistic data for a weapon differing not too widely from it in caliber, muzzle velocity, etc. are known or in calculating the effect of a change in bullet weight, web thickness, etc. in a given weapon. For this reason an explanation is given of the deduction of Rǒggla's equation and a description of the method of its application to interior ballistic problems.

PB 19784. KISTIAKOWSKY, G. B. and WILSON, E. B., JR. Report on the prediction of detonation velocities of solid explosives. (OSRD Rept 69). Jan 1941. 50 p. Price: Microfilm-50¢ - Photostat-$4.00
A formula has been worked out to calculate detonation velocities of explosives now in use and to predict the detonation velocities of new compounds. An approximate form of the equation of state is available, containing one unknown constant, being of the nature of covolume, and being also a function of the composition of the products and of the temperature, but is independent of temperature. There is some discussion of the relationship of the balance between the gas and the heat evolved in a reaction. Formulas, tables and bibliography are included. This work is part II to a report, The Hydrodynamic Theory of Detonation Wave.

PB 22042. KLINE, S. Q. Development of aimable cluster E4, 500-lb., for incendiary bombs AN-M50. (CWS Tech Div Memo Rept 724). Sep 1943. 16 p. Price: Microfilm-$1 - Photostat-$2.00
The object of the work described in this report was to develop an adapter for a 500-lb. aimable cluster of AN-M50 incendiary bombs, the cluster to be suitable for suspension from either single (center) or double lugs. Cluster E4, described in this report, meets all requirements for proper mechanical functioning and is suitable for bombing from altitudes above 2,500 feet. The appendix consists of a series of photographs.

PB 20685. LAWRENCE, E. T. The development of the H.C. smoke mixture. (Edgewood Arsenal Chemical Div Rept 227). Mar 1925. 73 p. Price: Microfilm-$1.00 - Photostat-$5.00
The object of this investigation was to develop a smoke mixture made entirely of solid ingredients. The development was successfully accomplished, using zinc, zinc oxide, and hexachloroethane. Tables and graphs are included.

PB 20684. LAWRENCE, E. T. and BROWN, S. F. Development of the 2-lb. H.C. candle, mark I. (Edgewood Arsenal Chemical Div Rept 226). Sep 1926. 63 p. Price: Microfilm-$1.00 - Photostat-$5.00
This report describes the development of a small, compact, efficient smoke producing device which weighs about 2 pounds and produces a large volume of smoke over a period of about 2½ minutes. The smoke mixture consists of hexachloroethane, zinc dust and zinc oxide and is pressed into the tin container. The method used for igniting this mixture utilizes a scratcher block and a matchhead that is in contact with a starter mixture held in a zinc cup. This report includes complete specifications for the production of this munition and for each of its components and drawings.

PB 20660. LEWIS, EVAN H. Tests of E4 aimable clusters of incendiary bombs AN-M50A1 at Dugway Proving Ground, Tooele, Utah: Interim report, Jul 30- Aug 8, 1943. (Dugway Proving Ground Special Rept 14). Sep 1943. 52 p. Price: Microfilm-$1.00 - Photostat-$4.00
The tests conducted with the E4 cluster were divided into phase I, dispersion and functioning tests on a flat clay target, and phase II, tests on typical Japanese and German civilian housing to obtain incendiary effect and penetration data. In phase I it was found that the E4 cluster trails the M38A2 practice bomb by about 150 yards when both bombs are released at the same time from a height of 10,000 feet. The cluster functions satisfactorily and is stable in flight. The dispersion pattern of the bombs released from a cluster at 2,000

feet is about 40 x 50 yards. In phase II it was found that the penetration of the M50 bombs when released from aimable clusters was much greater than with the same type bomb released from nonaimable clusters. The increased force of impact has a tendency to increase the percentage malfunctions, but this defect is lessened by the probability that many more hits will be obtained per cluster with the use of aimable clusters. The percentage of destructive fires caused by the M50 bombs was quite low. It is recommended that: (1) the E4 cluster be standardized and put into production, (2) an airburst tail fuse for the E4 cluster be produced to lessen the possibility of the cluster falling intact, (3) bombing tables be produced for use with this cluster, and (4) tests with the AN-M52 bomb in the E4 cluster be conducted with a view to use this bomb against Japanese targets. Photographs, tables, charts, and diagrams are attached.

PB 20659. LEWIS, EVAN H. and others. Functioning and dispersion of the M69X bomb when released from aimable clusters into a ground target. (Dugway Proving Ground Special Rept 38). Dec 1944. 32 p. Price: Microfilm-50¢ - Photostat-$3.00
The purpose of this work was to evaluate the functioning of the bomb and to determine its dispersion and ballistic characteristics when released from the 500-lb. cluster, E28. The M69X incendiary bomb possesses satisfactory ballistic characteristics when so released. The round closure bombs as tested are superior in functioning to those having hexagonal closure, perhaps due to the inclusion of the asbestos sleeve in the round closure bombs. Tables and dispersion charts are appended.

PB 20658. LEWIS, EVAN H. and MARTIN, J. E. Penetration into light structures, functioning and flight stability of modified AN-M50A2 bombs when released from aimable clusters. (Dugway Proving Ground Special Rept 37). Jan 1945. 18 p. Price: Microfilm-50¢ - Photostat-$2.00
The penetration data obtained is insufficient to warrant conclusions regarding the penetration of the modified magnesium incendiary bomb AN-M50A2 into light structures. Based on the results obtained it is concluded that the modified AN-M50A2 bomb as used in this test does not have satisfactory flight stability or functioning when released from the aimable cluster M17A1. Table, diagram, and dispersion patterns are appended.

PB 20674. MACINTIRE, B. G. White phosphorus and B.M. candle smoke screens; a preliminary report covering field tests. (Edgewood Arsenal Chemical Div Rept 213). Nov 1922. 30 p. Price: Microfilm-50¢ - Photostat-$2.00
A series of tests on the lateral obscuring power of smoke screens from white phosphorus and B.M. (H.C.) (hexachloroethane) candles has been carried out. Methods were also devised for measuring the width and height of the smoke clouds as well as for the collection of obscurance data. Comparisons between the shoots are made on a basis of pounds of material required per minute per yard of effective screening length of cloud. Among the conclusions are the following: (1) steady winds are the most favorable for screening; and (2) the screening power of the B.M. candle is only about one-third to one-half that of white phosphorus burned in open pans. Tables, photographs, and map are included.

PB 17087. MCLAIN, J. H. and ANDREWS, L. C. Development of the 90 MM base ejection HC smoke shell T17. (CWS Tech Div Memo Rept 972) Feb 1945. 34 p. Price: Microfilm-50¢ - Photostat-$3.00
A satisfactorily functioning smoke canister has been developed for use in the 90 mm Base Ejection HC Smoke Shell T17.

PB 17105. McLEOD, R. D. Report of test of 4.2-inch chemical mortar shell E48, FS and CG filled. (CWS Tech Div Memo Rept 30) Dec 1935. 9 p. Price: Microfilm-50¢ - Photostat-$1.00
As a result of the investigation it is concluded that: a. The E48 is a satisfactory shell for use with FS (SO_3 - chlorosulfonic acid smoke) and CG (phosgene). b. The fuze mechanism is satisfactory especially since all steel fused parts to be manufactured in the future will be cadmium plated instead of zinc plated.

PB 20520. MAZIA, JOSEPH and LIPSON, SAMUEL. Exterior finishes for artillery steel cartridge cases. Forty first report. (Frankford Arsenal Ordnance Lab Rept R-210) Jun 1942. 37 p. Price: Microfilm-50¢ - Photostat-$1.00
This report covers the examination of 37 mm M16 steel cartridge cases with certain corrosion resisting finishes. For protective value as well as economy of application it was tentatively concluded that zinc plating (0.0004" minimum) followed by Cronak treatment would be the best exterior finish for the cases. Finishes which were found to conform with the performance requirements of specification WIS 459 (revision 5) are: (1) Zinc plating (0.0005" ± 0.0001"); (2) Corronizing, 0.0005" (Ni Zn Ni); (3) copper or brass plating, 0.0001" minimum; and (4) Parkerizing plus rust inhibitive oil or wax. It was recommended that (1)zinc plated (0.0004" minimum) - Cronak treatment finish be given first consideration, (2) copper plating and brass plating (0.001" minimum) be considered as acceptable, (3) further work be done on Parkerizing, (4) extensive storage and firing tests be made on cases with the above finishes, (5) work on Corronizing be discontinued because of the scarcity of nickel and (6) work on Indium plating be discontinued because of its low corrosion resistance, high cost, and low melting point. References, tables, photographs, and drawings are included.

PB 22181. MILES, GEORGE E. and LONG, WILLIAM T. Frangible grenade (FS) M1, effect of rough-handling when packed according to C.W.S. specification 196-111-41. (CWS Tech Div Memo Rept 599). Mar 1943. 13 p. Price: Microfilm-50¢ - Photostat-$1.00
Wooden boxes containing 48 frangible grenades each, packed according to C.W.S. specification 196-111-41, were put into the rear of a dump truck and driven over rough roads and were also subjected to dropping tests from various heights. It was found that these cases of grenades withstood the rough-riding tests, and rough handling including free falls up to 20 feet onto concrete, without breakage. It was thus recommended that all frangible grenades be packed in accordance with C.W.S. specification 196-111-41. Photographs are included.

PB 20513. MURDZA, M. H. Corrosion tests on zinc plated, zinc plated-Bonderized and Parkerized oil-treated steel cartridge clips, U.S. rifle, caliber .30 M1. Final report. (Frankford Arsenal Ordnance Lab Rept R-106). Mar 1942. 28 p. Price: Microfilm-50¢ - Photostat-$2.00
Salt spray, humidity, water-soaked bandolier, and semi-protected outdoor weathering tests were conducted on assembled steel cartridge clips. In the accelerated corrosion tests the Parkerized-oil treated clips were definitely inferior to the others with respect to resistance to rusting. The zinc plated and zinc plated-Bonderized clips showed voluminous zinc corrosion products after 48 hours' salt spray attack and evidence of galvanically accelerated breakdown of the zinc coating in the area of contact between the clips and the rounds. The Parkerized-oil treated clips did not show any marked galvanic effects in the contact area. In the firing tests the only deleterious effect due to corrosion occurred with the Parkerized-oil treated clips which had been subjected to the water-soaked bandoleers for two to six months. These clips were difficult to chamber due to excessive rusting and caused fouling of the magazine and chamber with loose particles of rust. In the semi-protected outdoor weather test (6 months) all of the finishes showed little change in appearance. References, tables and photographs are included.

PB 6379. NISSEN, A. R. 4.2-inch chemical mortar development. A status report. July 12, 1938. (Edgewood Arsenal Tech Rept EATR 227). 1938. 70 p. Price: Microfilm-$1.00 - Photostat-$5.00
The object of the work reported was to design the following types of 4.2 inch chemical mortars: 1. Dug-in type, 2. Surface-setup type, and 3. mule-pack type. The report was written in 1929 just prior to the author's resignation. The report has been edited with as little change as possible and a new abstract has been added which gives the status of the development in 1938. 32 photographs are included.

PB 19865. REEVES, A. M. Recovery of dyes from colored smoke mixes. (CWS Tech Div Memo Rept 1228) Feb 1946. 12 p. Price: Microfilm-50¢ - Photostat-$1.00
This report describes the results of the investigation of methods for the reclamation of the dye from rejected colored smoke mixes. No recovery of the inorganic matter was contemplated. In general, these mixes contained a water insoluble amino dye, potassium chlorate, alkali carbonates and either sulphur or sugar. All these mixes were first treated with water to remove the soluble salts. Subsequent treatment varied according to the chemical compounds involved. Tables of the single dyes and the dye mixtures are given, satisfactory separation being accomplished in most cases.

PB 20642. ROCKWELL, P. O. The Public Health Service canister. (Edgewood Arsenal Chemical Div Rept 271). Jun 1923. 27 p. Price: Microfilm-50¢ - Photostat-$2.00
In the fumigation of ships and buildings the U.S. Public Health Service requires a mask which will afford specific protection against a mixture of cyanogen chloride and hydrocyanic acid. Such a canister has been developed and is described in this report. Tables, graphs and diagram are included.

PB 20516. ROSENTHAL, HYMAN and FRANCE, RAMON D. Stresses in the neck of 75 mm cartridge cases: First and final report. (Frankford Arsenal Ordnance Lab Rept 46) Aug 1940. 11 p. Price: Microfilm-50¢ - Photostat-$1.00
A series of tests were conducted to determine the internal stress in the necks of 75 mm cartridge cases that had been subjected to one of two experimental heat treatments. These tests were necessitated by the high percent of neck failures noted when the cases were subjected to the standard $HgNO_3$ acceptance test (U. S. Army Specification No. 50-46-1A, sect. D-4). One of the treatments was found to reduce the internal stresses to a low value. Another series of tests revealed the absence of a relationship between the hardness and the stress in the neck of the case. Tables are included.

PB 17313. SCHANTZ, E. J. and others. PT-2 incendiary gels thickened with synthetic rubber. (CWS Tech Div Memo Rept 962) Jan 1945. 42 p. Price: Microfilm-50¢ - Photostat-$3.00
From the data reported it is concluded that: A satisfactory incendiary gel (PT-2) of the pyrotechnic type was developed; the gel was stable when stored at both -40° F. and 150° F. temperatures; it performed satisfactorily when fired statically from M47 and M76 bombs; it did not show significant variations in firing characteristics at temperatures of -30° F., 50° F., and 130° F. Enclosed are a drawing, table, graph and formulas.

PB 17089. SMITH, B. F. HC smoke mix: Engineering tests of substitutes for ammonium perchlorate in the HC smoke mix. (CWS Tech Div Memo Rept 246) Sep 1940. 15 p. Price: Microfilm-50¢ - Photostat-$1.00
As a result of this investigation it is concluded: (a) Potassium nitrate is a suitable substitute for ammonium perchlorate as the oxidizing agent in the HC smoke mix. It is readily available in any quantity or grade and at a cost approximately one half that of the ammonium perchlorate. (b) In case difficulty is experienced in the procurement of potassium nitrate, potassium perchlorate can be used.

PB 17096. SMITH, B. F. and WOODBERRY, D. L. 30-lb. chemical bomb T2E1, engineering test at Aberdeen Proving Ground. (CWS Tech Div Memo Rept 204) Dec 1939. 21 p. Price: Microfilm-50¢ - Photostat-$2.00
The object of the investigation was to determine the functioning of the 30-lb. chemical bomb T2E1 (with and without fuses) and to record the distribution of the simulated HS therefrom when the bombs were dropped from 100 ft. to 5000 ft. altitudes. From the results of the tests obtained it is concluded that: a. The 30-lb. chemical bomb T2E1, is not sufficiently stable in flight to permit accurate bombing from an altitude of 2000 ft. and up. b. The distribution of the simulated HS was satisfactory from the bombs equipped with the T21 fuse and the 65 gram tetryl bursting charge. This distribution was superior to that obtained with the T2 and M3A1 unfused bombs. c. The bombs not equipped with fuses and burster charges are not satisfactory for chemical distribution in that they did not rupture satisfactorily upon impact. d. The fragments from the T2E1 bombs would not in any way endanger the airplane when dropped from 75 to 100 ft. altitude.

PB 18854. STRECKER, H. A. Rate studies on primacord detonating fuse. (OSRD Rept 5610). Oct 1945. 9 p. Price: Microfilm-50¢ - Photostat-$1.00
Rates of detonation are given for various samples of Primacord, measured with the rotating drum camera. This study was undertaken to determine the rate of detonation and its reproducibility for use in timed and simultaneous initiation experiments. The techniques employed in firing the Primacord are described. Variations found in the rate cannot be correlated with position either in the roll or lot. Neither kinking nor confining in a metal casing affected the rate appreciably. Tracing drawings of Primacord are included.

PB 20514. TUCKER, C. W. and others. Residual stresses in cold-drawn nonferrous alloys: an X-ray study, Part VII, Tenth report. (Frankford Arsenal Ordnance Lab Rept R-656) Sep 1945. 51 p. Price: Microfilm-$1.00 - Photostat-$4.00
This report covers the results of measurements on four lots of experimental caliber 0.30 brass cartridge cases prepared for this program by the Frankford Arsenal Ordnance Laboratory under contract with Lehigh University. The variations in the present lots were: (a) Pocketing and heading ejection stem polished, (b) pocketing and heading ejection stem sand blasted, (c) steel tapering die, and (d) chromium plated tapering die. The X-ray stress measurements and corrosion-cracking tests did not reveal any outstanding irregularities in these lots of cases. However, a new type of maximum in the strain-free lattice parameter curves of two of the cases was noted and its possible origin(s) discussed. The appendix of this report contains the stress curves for the individual cases and positions. Other graphs and diagrams are included.

PB 18555. U. S. CHEMICAL WARFARE SERVICE. Airplane smoke tank M10. (Tech Bulletin 3-255A-1) Nov 1944. 159 p. Price: Microfilm-$2.00 - Photostat-$11.00
This bulletin describes the M10 airplane smoke tank - its characteristics, how it is assembled, filled, and installed on airplanes. Information is included on maintenance, cleaning of tanks used in training, accessories, and field improvisations. Illustrations and diagrams.

PB 18553. U. S. CHEMICAL WARFARE SERVICE. Airplane smoke tanks AN-M33A1 and M33. (Tech Bulletin 3-255B-1) May 1945. 232 p. Price: Microfilm-$2.50 - Photostat-$16.00
This bulletin describes AN-M33A1 and M33 smoke tanks - their characteristics and how they are assembled, filled, and installed on or in airplanes. Information is included on maintenance, cleaning of tanks used in training, accessories, and field improvisations. The AN-M33A1 and M33 smoke tanks are used to lay smoke screens and to spray blister gases, tear gases, and training substitutes for mustard gas from airplanes. They are mounted either on the wings or inside the bomb bay. Photographs and diagrams are included.

PB 11518. U. S. CHEMICAL WARFARE SERVICE. Directive for production of Victory Cocktails. (Field Lab Memo 2-5-4) May 1943. 16 p. Price: Microfilm - 50¢ - Photostat - $2.00
This report gives the instructions for production of Victory Cocktails (an incendiary grenade) as developed and employed at the Hawaiian Chemical Warfare Depot, lists the required materials, and gives directives for packing the filled bottles. Photographs and drawings are given, including a drawing of the filling machine.

PB 18994. U. S. PICATINNY ARSENAL, DOVER, N. J. Description of manufacture: Bomb, fragmentation, 23 lb., M40, 20 lb. M41 & M42, body assembly, manufacture and assembly of metal parts. Aug 1941. 61 p. Price: Microfilm-$1.00 - Photostat-$5.00
The method described in the manufacture of these bomb bodies is based on information obtained from the Edward G. Budd Manufacturing Company, Philadelphia, Pa. The information was compiled for use as a guide in connection with the preparation of plans for the war-time production of this item, and as an aid to manufacturers showing a possible method of procedure in the event of actual production in an emergency. All the detailed drawings included here may not reproduce well as some of them appear blurred on the blueprints. A bill of materials is given.

PB 18996. U. S. PICATINNY ARSENAL, DOVER, N. J. Description of manufacture: Bomb, practice, 100 lb., M38A2, manufacture of metal parts. Sep 1938. 42 p. Price: Microfilm-50¢ - Photostat-$3.00
This book describes a method of manufacturing and inspecting metal parts of the bomb, practice, 100 lb., M38A2, at the rate of 2000 per 24 hours, based on the practice used by a commercial manufacturer during 1938. Drawings of items of equipment, where available, follow immediately after the operation sheets where the item is first mentioned. All the detailed drawings included here may not reproduce well as some of them appear blurred on the blueprints and photostats. Photographs are also included. Lists of machines, tools, jigs, fixtures, and gages, and a bill of materials are given.

PB 18995. U. S. PICATINNY ARSENAL, DOVER, N. J. Description of manufacture: Booster, M20, manufacture of metal parts. Sep 1940. 151 p. Price: Microfilm-$2.00 - Photostat-$11.00
Detailed descriptions of the method of manufacturing and inspecting metals parts for this booster as used at Picatinny Arsenal are given in this report. The information was compiled for use as a guide by contractors. Details of operations are listed in tabular form. Lists of materials, parts and specifications, photograph, numerous drawings, and information in regard to Government inspection are included.

PB 18993. U. S. PICATINNY ARSENAL, DOVER, N. J. Description of manufacture: Primer, electric, M30, manufacture of metal parts, loading, assembling and packing. Nov 1940. 73 p. Price: Microfilm-$1.00 - Photostat-$5.00
Methods of manufacturing the metal parts, and of loading, assembling and packing this electric primer are described in this report. Methods are based on information received from manufacturers who received subcontracts from Frankford Arsenal for the manufacture of inert parts, while the loading, assembling and packing was accomplished at Picatinny Arsenal. Step-by-step details of operations are listed in tabular form. Numerous drawings, photograph, information on government inspection, and lists of machine tools or major equipment requirements are included.

PB 20675. WALKER, H. W. Preliminary report on the size, shape and concentration of smoke clouds. (Edgewood Arsenal Chemical Div Rept 214). Oct 1922. 9 p. Price: Microfilm-50¢ - Photostat-$1.00
It is the purpose of this investigation to devise a means for the rapid estimation of the concentration of smoke clouds at various distances from the generating source, or in case the desired concentration is known, to devise a means for the determination of the proper quantity of material to be used per minute in order to obtain this requisite concentration. Concentration formulae are given, and graphic and algebraic details showing the deduction of these formulae are included in the report.

PB 20692. WEAVER, F. R. 9-pound D.M. candle. (Edgewood Arsenal Chemical Div Rept 241). Feb 1924. 102 p. Price: Microfilm-$1.50 - Photostat-$7.00
This report is on the development of a reasonably efficient DM (diphenylaminechlorarsine) toxic candle to be manufactured on a production basis. The report covers the experimental work involved and includes sketches, specifications, and estimated costs for the manufacture and method of loading of the candle.

PB 20639. WEAVER, F. R. The development of a screening smoke generator for type F-5 sea planes. (Edgewood Arsenal Chemical Div Rept 268). Mar 1923. 32 p. Price: Microfilm-50¢ - Photostat-$3.00
This report covers the work done on the development of apparatus which may be attached to a type F-5 sea plane for generating screening smokes. F.M. (titanium tetrachlorides) is the smoke producing substance. Tests carried out on a Navy sea plane proved successful. A number of photographs of the cloud are included as well as drawings and specifications of apparatus used and instructions for its installation and operation.

PB 20641. WEAVER, F. R. Preliminary report on the development of a screening smoke apparatus for Martin bombers. (Edgewood Arsenal Chemical Div Rept 270). Jul 1923. 14 p. Price: Microfilm-50¢ - Photostat-$1.00
Report of experiments at Aberdeen Proving Ground and Edgewood Arsenal to determine the feasibility of generating smoke screens from a Martin bomber by introducing titanium tetrachlorides (F.M.) into the exhaust manifolds or of ejecting liquid F.M. backward at the same speed as the speed of the plane (approx. 80 m.p.h.). Preliminary tests showed that the smoke producing qualities of F.M. were superior to those of stannic chloride, oleum, or chlorsulphonic acid for spraying purposes. Results of the tests demonstrate that both methods of generating smoke screens can be successfully adapted to a Martin bomber, however, F.M. fumes weakened the untreated cloth of the fuselage and corroded metal that was not varnished or painted. A complete account of the equipment and findings of the tests is followed by a drawing of the experimental apparatus designed for the smoke screening test.

PB 20636. WEAVER, F. R. The development of a signal smoke generator for type F-5 sea planes. (Edgewood Arsenal Chemical Div Rept 266). Feb 1923. 18 p. Price: Microfilm-50¢ - Photostat-$1.00
This report covers the work done on the development of an apparatus for generating a smoke cloud intended to be used on the F-5 type of sea planes for signal purposes. Titanium tetrachlorides (F M) is introduced under pressure into the exhaust manifold, and volatilized by the hot exhaust gases, and, on coming in contact with the moist air, produces dense white smoke. Tests carried out on a Navy seaplane were entirely successful. The smoke material had no apparent effect on the airplane fabric. Photographs, drawings and specifications for the apparatus used and instructions for installation and operation are given.

PB 20695. WEAVER, F. R. The development of the 4-inch Stokes mortar shell, C.N. burning type. (Edgewood Arsenal Chemical Div Rept 245). Jan 1923. 30 p. Price: Microfilm-50¢ - Photostat-$2.00
The subject shell has been developed, the final method of loading as outlined in this report giving satisfactory results. Tables and diagram are included with the historical, theoretical and experimental data.

PB 20637. WEAVER, F. R. The development of the 4-inch Stokes mortar smoke shell with H.C. filling. (Edgewood Arsenal Chemical Div Rept 264). Jan 1923. 23 p. Price: Microfilm-50¢ - Photostat-$2.00
A 4-inch Stokes mortar smoke shell, officially designated as "Shell, 4", S.M. Smoke, Mark I, M-1, H.C. Burning Type, Experimental" (Drawing no. 2290), has been developed by modifying the "4-inch Stokes trench mortar incendiary shell, Mark 1" by drilling 24 holes 3/8 inch in diameter, around the head of the shell, and covering these with a strip of zinc 2½ inches wide and from .010 to .017 inch thick. This modification is identical with that of the 4-inch Stokes mortar shell C.N., burning type. Specifications for the filling, ignition and fuse and all details concerning this type of Stokes shell are given in this report.

PB 20702. WILLIAMS, C. L. Surveillance of action of brombenzylcyanide on lead lined shell and boosters, and on unlined shell, and of bromacetone on lead lined shell. (Edgewood Arsenal Chemical Div Rept 154) May 1922. 8 p. Price: Microfilm-50¢ - Photostat-$1.00

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Lead plated shell and boosters were attacked by crude brombenzylcyanide, forming a coating of lead bromide on the surface, which acted as a protection against further attack. The brombenzylcyanide showed no decomposition in the lead lined shell for six months at room temperature, after which slight decomposition took place. Surveillance tests were also made with brombenzylcyanide on steel plates, and in each experiment there was a noticeable change in appearance of the gas (from a water-white to a dark red solution on one hour's standing). Bromacetone completely decomposed in lead lined shell at room temperature on standing 30 days, and lead bromide was formed on the lining of the shell.

PB 20696. WILLIAMS, C. M. and BROWN, S. F. Development of C.N. hand grenade. (Edgewood Arsenal Chemical Div Rept 246). Oct 1922. 79 p. Price: Microfilm-$1.00 - Photostat-$6.00
This report is a complete revision of Report no. E.A.C.D. 66, bringing the development of the C.N. (chloroacetophenone) hand grenade, officially known as Grenade, Hand, Sachrymatory C.N., up to date (1922). Tables, drawings, diagrams, and graphs are attached.

PB 5031. WILLKE, LOUIS G. Functioning tests of sample AN-M50X-A3 bomb noses submitted by the McWane Cast Iron Pipe Co., and the Milwaukee Stamping Co. (CWS Tech Command Informal Rept 75). Feb 1944. 14 p. Price: Microfilm-50¢ - Photostat-$1.00
The object of this report was to determine whether either of the two types of bomb noses submitted could be used for the AN-M50X-A3 bomb. Fragmentation tests, 1000 foot drop tests, skate test, and 4300 foot drop tests are described with results presented in tabular form. Photographs show the bombs after tests. None of these types of AN-M50X-A3 bomb noses were approved for production.

PB 17100. WOODBERRY, D. L. Report of static fragmentation test of 81 - mm. chemical shell, T9, FS and WP filled. (CWS Tech Div Memo Rept 149) Dec 1938. 14 p. Price: Microfilm-50¢ - Photostat-$1.00
The static firing test described in this report was too limited to permit a definite conclusion, however, the results indicate that the 81-mm. chemical shell T9 is satisfactory.

PB 17109. WRIGHT, H. V. Report of test of 4.2-inch chemical mortar shells, E48, manufactured by Frankford Arsenal. (CWS Tech Div Memo Rept 11) Nov 1935. 4 p. Price: Microfilm-50¢ - Photostat-$1.00
It is concluded that the 4.2-inch chemical mortar shell E48 is apparently stable in flight when filled with CG, HS, and FS (phosgene, mustard gas and SO_3 - chlorosulfonic acid smoke respectively) to a weight of 25.5 lb. and fired from the chemical mortar surface setup with standard E7.

PHOTOGRAPHIC AND OPTICAL GOODS (INCLUDING PHOTOGRAPHIC PROCESSING)

German

PB 20090. BROCK, G. C. and others. I. G. Photopapier-Fabrik, AGFA, Leverkusen, near Cologne. (BIOS Final Rept 252, Item 9). n.d. 93 p. Price: Microfilm-$1.00 - Photostat-$7.00
The photographic paper factory described in this report forms a part of the I. G. plant at Leverkusen which manufactures a wide range of heavy inorganic chemicals and organic chemicals, synthetic rubber, etc. The raw paper is not manufactured by this company but is obtained from paper making companies. This report covers the following subjects: Baryata coating; manufacture of barium sulphate; emulsion making; storage and finishing; preparation of the coating; emulsion drying; air purification; air filtration; distilled water supplies; silver recover; testing, cutting, examining and packing sensitive stock; and special products of Leverkusen. Samples of all papers manufactured at Leverkusen were brought back and have now been tested. They are generally of excellent commercial quality and the high gloss of the glossy papers is noteworthy. Their photographic speeds are appreciably lower than those of typical competing British products, however, and this applies even to the X-ray and recording papers. The general impression was that the factory was laid out and organized with uncommon efficiency. Apart from the interesting methods of air purification, however, it showed few striking advances in technical detail. It was concerned mainly with bulk production of a few major lines and relied largely on I.G., Wolfen, for fundamental research. Photographs and diagrams of machinery illustrate the report. Appendix A contains the report of a visit to the Felix Schoeller plant which provided the raw paper for I.G. However, the object of the visit to Schoeller was to inspect the types of waterproof paper which was made there. Included in this appendix is a translation of a document received from Felix Schoeller on the making of document reversal paper and on transparent photopaper. Formulas for the following Agfa papers are given: Lupex; Brovira; Portriga; X-ray; document reversal, gas-light; cine-positive; copying, photostat, correctostat (a map making paper). This last section is in German.

PB 22826. ENGEMOEN, R. C. Theodolites. (Naval Tech Mission in Europe Tech Rept 392-45) Sep 1945. 4 p. Price: Microfilm - 50¢ - Photostat - $1.00
This report summarizes the various uses that may be made of the kino-theodolites which were in the process of being shipped to the United States. Since no instructions were included with the units information concerning the operation and the use of these machines was provided in this report.

PB 22945. TANNER, H. S. Some German developments on inorganic films of optical thickness. (Naval Tech Mission in Europe Tech Rept 473-45) Sep 1945. 18 p. Price: Microfilm - 50¢ - Photostat - $2.00
This report describes procedures for producing thin inorganic films and their use as mirrors, filters, reflection reduction coatings, iconoscope screens, and transparent conducting films. It is felt that some of these developments such as the SiO protective coating used on mirrors and the Schott flame process used for non-reflecting coatings on glass are of considerable potential value for other applications. Results of abrasion resistance and chemical stability tests on mirrors are given. The three following processes for producing reflection reducing coatings on glass are described: Leitz, Zeiss and Schott. Graphs and negatives of the graphs are included in the report.

United States

PB 21123. HILL, G. A. and CLARKE, R. G. Improvement of photoflash bombs: Progress report. (OSRD Rept 2010). Nov 1943. 37 p. Price: Microfilm-50¢ - Photostat-$3.00
About fifty new flash powers were formulated, and large scale tests were made with those powders of particular interest. A critical study of sensitometric methods used by the group was conducted and various types of photographic film tested for spectral range and sensitivity. A study of the problem of flash bomb casings indicates that a given type of flash will have its optimum casing. Plans are given for future tests, and appendices contain a drawing, graphs and report of tests with full size photoflash bombs.

PB 22268. LANE, F. W. and PINKHAM, B. N. Gas mask spectacles, preliminary investigation. (CWS Tech Div Memo Rept 286) Jun 1941. 12 p. Price: Microfilm - 50¢ - Photostat - $1.00
The development of optical aids for use with gas masks has been carried on intermittently by the Chemical Warfare Service since about 1926. A resume of the experimental work carried on indicates that spectacles and other optical aids developed have shown one or more defects. Military characteristics of spectacles for use with gas masks were proposed, and were intended as a guide for future development. A bibliography is included.

PB 21904. U. S. WAR DEPARTMENT. Camera PH-270 and recorder PH-271. (Tech Manual 11-2353). Feb 1945. 96 p. Price: Microfilm-$1.00 - Photostat-$7.00
This manual gives a complete description of the subject camera and recorder, explains installation, operation, and maintenance of the equipment, and gives a list of maintenance parts. This equipment is used to take motion pictures and record sound simultaneously on the same 35 mm film. The camera and recorder are for use by newsreel and other motion picture assignment units of all types throughout the armed forces. Depth of field tables for the 5 lenses (35-mm, 50-mm, 75-mm, 100-mm, and 152-mm) provided with this camera are given. There is also a table of hyperfocal distance and a table of filter factors. Photographs, drawings, diagrams, curves, and lubrication charts are included.

PB 22061. U. S. WAR DEPARTMENT. Camera PH-431. (Tech Manual 11-2383) May 8, 1945. 70 p. Price: Microfilm-$1.00 - Photostat-$5.00
The small, hand-held, amateur type camera discussed in this manual is Eastman Kodak's Magazine Ciné-Kodak, 16-mm. This small daylight-loading, magazine-type camera is adapted to use under circumstance in which larger and more complex cameras would be impractical. It can be loaded in a few seconds and film magazines can be changed at any time without loss of unused film. It is designed for taking silent motion pictures of 16-mm reversal film. Following the description of the camera and its parts are complete instructions for operating the camera and for disassembling and repairing it. Photographs, diagrams, equipment check list, preventive maintenance check list, lubrication chart, and tables are given.

PB 22058. U. S. WAR DEPARTMENT. Densitometer PH-326. (Tech Manual 11-2301) Feb 1945. 25 p. Price: Microfilm-50¢ - Photostat-$2.00
This manual describes an instrument which is designed to measure the density of a silver deposit in a photographic image. Density is the expression for denoting the amount of light absorbed by a medium in relation to the light incident on it. This is a visual type instrument which makes possible a comparison of two photometric fields through the medium of a calibrated photographic wedge. Since the instrument measures the value of light transmitted through the film or plate in question it is called a transmission densitometer. The instrument measures area 0.5 mm in diameter anywhere on films or plates up to 6 inches wide. Its measurable range of density is from 0 to 3.0 (100-percent to 0.1-percent light transmission). The manual discusses the theory of operation and gives instructions for operating the equipment, for maintaining it and making minor repairs. Photographs and diagrams illustrate the manual. A density-percent transmission table and a maintenance parts list are included.

PB 22082. U. S. WAR DEPARTMENT. Developing machine PH-298. (Tech Manual 11-2376) Sept 1945. 104 p. Price: Microfilm-$1.50 - Photostat-$7.00
The description of the developing machine is followed by instructions for operations, maintenance, and repair. This machine is a complete, mobile equipment for the positive and negative processing of 35-mm motion picture film at field base service laboratories either at home or abroad. It is self-contained with every component and accessory needed for film processing. The machine is designed to be operated in a photographic darkroom. Developing time is controlled by a variable speed transmission system which is set in film speed per minute. The temperature of the developing solutions is maintained within limits by a thermostatically controlled refrigeration unit and heater elements. Photographs, diagrams, wiring diagrams, lubrication orders, and a darkroom floor plan illustrate the manual. A maintenance parts list and an appendix of laboratory procedure and formulas are included.

PB 22056. U. S. WAR DEPARTMENT. Developing machine PH-413-A (V-mail). (Tech Manual 11-2315) May 1945. 119 p. Price: Microfilm-$1.50 - Photostat-$8.00
The manual describes the developing machine and gives instructions for operating, maintaining and repairing it. This developing machine is a self-contained unit capable of developing, fixing and drying 16-mm perforated or unperforated film at a rate of from 7 to 15 feet per minute. The machine is continuous in its operation, drawing film from the supply flange in the supply magazine and passing it through the various solutions and washing tanks, on through the drying compartment and rewinding it on a take-up reel at a speed selected by the operator to insure proper development. With the exception of the loading of film on the supply flange, the entire procedure is carried out in a normally lighted room. The unit incorporated automatic temperature control to keep the temperature of the solutions between 66° and 70°F. Operating instructions give step by step procedures. An equipment performance check list covers each step in the procedure. Instructions are given for preventive maintenance which is defined as the series of operations performed on equipment to minimize interruptions in service and to prevent major breakdowns. A preventive maintenance check list is included. There is a trouble chart and specific instructions are given to help personnel locate trouble and correct it. Photographs, diagrams, tables, and curves illustrate the manual. Formulas are given for Eastman Kodak D-11, SB-1, F-5, and the glycerine-aerosol bath.

PB 22201. U. S. WAR DEPARTMENT. Dryer-PH-75. (Tech Manual 11-2364) Feb 1945. 40 p. Price: Microfilm-50¢ - Photostat-$3.00
The dryer described in this manual is designed for use with glossy prints which can be dried and ferrotyped in the dryer. Heat and drying speed may be adjusted for satisfactory drying of matte and semimatte surfaces. Instructions are given for assembly, installation, operation, maintenance and repair of the equipment. Photographs, diagrams, and lubrication chart illustrate the text. An equipment performance check list, a trouble chart and a maintenance parts list are included.

PB 22228. U. S. WAR DEPARTMENT. Dryer PH-176. (Tech Manual 11-2355) Oct 1944. 28 p. Price: Microfilm - 50¢ - Photostat - $2.00
The dryer described in this manual is a complete, electrically operated unit for drying various weights and sizes of matte or semimatte photographic prints quickly and continuously. Instructions are given for installation, operation, maintenance and repair of parts. Photographs, drawings and diagrams illustrate the text, a trouble chart and a maintenance parts list are included.

PB 22195. U. S. WAR DEPARTMENT. Electronic timer: (Photrix model 1528). (Tech Manual 11-2395) Oct 1944. 34 p. Price: Microfilm-50¢ - Photostat-$3.00
The electronic timer, Photrix model 1528, described in this manual is a compact timing device designed to control the exposure time of photographic printers, enlargers, or other photographic equipment by regulating the length of time of current flow to the equipment. Instructions are given, illustrated by photographs and diagrams, for installation, operation, and maintenance. A discussion of the functioning of the parts and a maintenance parts list are included.

PB 22246. U. S. WAR DEPARTMENT. Enlarger PH-511/GF (V-mail). (Tech Manual 11-2306) Jul 1945. 68 p. Price: Microfilm - $1.00 - Photostat - $5.00
This manual contains a complete description of the V-mail enlarger and instructions for operating, maintaining, and repairing the equipment. This enlarger is a manually-operated machine, designed specifically to print individual V-mail facsimiles on roll paper. The enlarger accomodates a 100-foot roll of 16-millimeter film, the images of which are projected one at a time on a roll of photosensitive paper 4½ inches wide and 825 feet long. This machine is particularly useful in making reprints where the first run through the continuous enlarger has yielded some defective prints. The operator can hand-wind the film quickly through this machine making prints of only those negative images that require reprinting. In small installations

this machine can be used as the production machine. It is capable of exposing as many as 1,500 facsimiles per hour. There are drawings and diagrams to illustrate the text. Lubrication orders, a performance check list, a preventive maintenance check list and a trouble chart are included.

PB 22199. U. S. WAR DEPARTMENT. Identification set AN/TFQ-3. (Tech Manual 11-2367) Oct 1944. 27 p. Price: Microfilm-50¢ - Photostat-$2.00
The identification set described in this manual is a self-contained unit for making and processing direct positive identification pictures. It has its own darkroom, and is equipped with a camera which consists of exposure chamber, paper conveyor mechanism, lens with optical prism attached, and shutter. It also includes an illumination system with lighting fixtures and lamps, stool, swivel bar, mirror, ventilating fan, safety lights, bench, shelf, celluloid sheet, and test paper. Instructions are given for setting up the equipment, for making the exposure and for processing prints. There are also some instructions relative to maintenance and repair. Photographs and a wiring diagram illustrate the text.

PB 22186. U. S. WAR DEPARTMENT. Light meter; V-mail. (Tech Manual 11-2313) Mar 1945. 24 p. Price: Microfilm-50¢ - Photostat-$2.00
The V-mail light meter described in this manual is an instrument for measuring light in foot-candles by the use of a light-sensitive dry plate or barrier-layer cell. This is a General-Electric model. Step by step procedure for using the meter is given in the manual as well as suggestions for maintenance. Diagrams and photographs illustrate the manual.

PB 22197. U. S. WAR DEPARTMENT. Press PH-125. (Tech Manual 11-2375) Mar 1945. 19 p. Price: Microfilm-50¢ - Photostat-$2.00
This manual describes an electrically heated, hand-operated press for mounting photographic prints and other copy on mounts or back to back. It operates on 110- to 125- volt a-c or d-c circuit. This is the Eastman Kodak dry mounting press, model E. Instructions are given for installation and assembly, operation, maintenance and repair. Photographs and diagrams illustrate the text.

PB 22212. U. S. WAR DEPARTMENT. Printer PH-13-B. (Tech Manual 11-2391) Jun 1945. 18 p. Price: Microfilm - 50¢ - Photostat - $2.00
The printer described in this manual is an 8 x 10 inch table model, manually operated, photographic contact printer which will make prints of any size up to 7½ by 10-3/8 inches. It operates on 110- to 120 volt, 60-cycle, alternating current, or 110- to 120-volt direct current. Step by step operating instructions, maintenance and repair instructions are given in the manual. Photographs, a wiring diagram and a list of maintenance parts are included.

PB 22241. U. S. WAR DEPARTMENT. Printer PH-95-A (Tech Manual 11-2374) Jun 1945. 42 p. Price: Microfilm - 50¢ - Photostat - $3.00
This manual contains instructions for the installation and assembly, operation, maintenance, and repair of the subject printer, large, heavy, studio, projection printer designed to make enlargements from negatives of any size up to 8 by 10 inches. It will produce enlargements up to 5 diameters, and is equipped with a timer and magnetic shutter which permit automatic timing of exposure. The use of the shutter and timer is optional. Exposures can be made by means of either the shutter or a red filter. The printer is used with a 110- to 120-volt, 60 cycle, a-c power supply. Photographs and diagrams illustrate the manual. A trouble chart and maintenance check lists are included.

PB 22243. U. S. WAR DEPARTMENT. Printer PH-192. (Tech Manual 11-2365) Mar 15, 1945. 26 p. Price: Microfilm - 50¢ - Photostat - $2.00
This manual contains instructions for operating, maintaining, lubricating and repairing the printer, a manually-operated contact printer consisting of a printing head mounted on a lamp box. It provides a convenient method of making contact prints from various sizes of photographic negatives, from 35 mm up to 5 by 7 inches. Adjustable masks are used. Drawing, photographs and diagrams illustrate the text. A maintenance parts list is given.

PB 22083. U. S. WAR DEPARTMENT. Printer PH-193. (Tech Manual 11-2372) Apr 9, 1945. 26 p. Price: Microfilm-50¢ - Photostat-$2.00
This manual contains a description of a hand-operated machine which is designed to make contact prints from 35 mm film. Prints may be made on strip photographic paper or on positive film. Instructions are given for installation and operation of the equipment and for simple repairs. Photographs and a wiring diagram illustrate the manual. A maintenance parts list is included.

PB 22200. U. S. WAR DEPARTMENT. Printer PH-807/PT. (Tech Manual 11-2362) Jan 1945. 30 p. Price: Microfilm-50¢ - Photostat-$2.00
This manual describes and gives instructions for installing and assembling, operating, maintaining and repairing the subject printer. This portable equipment includes a printer, electrical connecting cable assemblies, developers, and certain spare parts. The printer is designed to make both photographic prints and reproductions, and it may also be used as a light box for blocking and retouching. It can make prints from negatives and X-ray films and can reproduce anything written, printed, typed, traced, drawn, sketched, photographed or blueprinted, up to 11 by 14 inches in size. Images may be reproduced either in white on black (negative), or in black on white (positive). Applicable for either field or office use, the printer operates from a 105- to 125- volt, a-c or d-c power source, or from a 12-volt storage battery. Photographs, a wiring diagram, and a maintenance parts list are included.

PB 22196. U. S. WAR DEPARTMENT. Print straightener PH-146. (Tech Manual 11-2382) Feb 1945. 24 p. Price: Microfilm-50¢ - Photostat-$2.00
The print straightner discussed in this manual is the Eastman print straightener model C. It is used to remove the curl from photographic prints up to 14 inches wide. It operates on 115-volt, 60-cycle, alternating current only. Instructions are given for installation, assembly, operation, maintenance and repair. Photographs and diagrams illustrate the text. A parts list is included.

PB 21931. U. S. WAR DEPARTMENT. Projector equipments PH-131-A through PH-131-C. (Tech Manual 11-2357). Dec 1944. 134 p. Price: Microfilm-$1.50 - Photostat-$9.00
This projector equipment is Bell and Howell 16 mm projection equipment. Each projector equipment consists of a projector with a sound head and an amplifier, a loudspeaker, a screen, and the necessary carrying cases. Instructions are given for installation, operation and maintenance of equipment. Photographs, drawings and diagrams illustrate the manual. A maintenance parts list is included.

PB 22053. U. S. WAR DEPARTMENT. Projector PH-543/U (V-mail). (Tech Manual 11-2304) Mar 1945. 36 p. Price: Microfilm-50¢ - Photostat-$3.00
The manual contains instructions for operating, maintaining and repairing this equipment which is a portable projector designed for the rapid inspection of perforated or unperforated 16-mm V-mail film. The film strip is drawn continuously across the light path by a small motor. The constantly moving images are projected two images in width through a scanning lens on a white wall or screen enabling the operator to scan them for defects. When a doubtful frame comes into view a manually operated clutch stops the film and a second projection (inspection) lens mounted in the lens turret can be swung into the light path by turning a knob located on

the rear of the machine. This lens projects a greatly enlarged image of the frame so that identifying data can be noted by the operator without moving from his operating position. Defective frames can be marked for identification by a film-punch mechanism without removing the film from the machine. The projector consists of five component parts: the body; the lamphouse assembly; the lens-turret assembly; the film-punch mechanism; and the power supply and film drive system. Photographs, diagrams, charts, and references complete the manual.

PB 22064. U. S. WAR DEPARTMENT. Reader PH-284 (V-mail). (Tech Manual 11-2309) Feb 1945. 55 p. Price: Microfilm-$1.00 - Photostat-$4.00
This manual describes the V-mail reader and provides necessary instructions for operating, maintaining and repairing it. This equipment is a dual-purpose machine used either for reading 16-mm film by means of enlarged images projected on a built-in translucent screen, or for making enlarged photographic prints from 16-mm film. A simple conversion process permits its use for either purpose. It operates from 100- to 125-volt alternating or direct current. The machine incorporates the mechanism necessary to project images from a 16-mm film strip to the vertical viewing screen located within the cabinet for film inspection purposes. Photographs, diagrams, a list of references, a lubrication chart, maintenance check lists, exposure chart for enlargements, and trouble chart supplement the text.

PB 22044. U. S. WAR DEPARTMENT. Recorders PH-283, PH-283-T: V-mail. (Tech Manual 11-2310) Sep 1945. 57 p. Price: Microfilm - 50¢ - Photostat - $3.00
This manual describes the recorders and provides instructions for their operation, maintenance and repair. The recorder is a semi-automatic copying machine designed to photograph records, letters, and documents not exceeding 8½ inches in width on 100-foot spools of 16-mm film. The equipment photographs all copy in motion and accomodates work as rapidly as it can be fed into the machine (approximately ½ documents per minute). Photographs, diagrams, lubrication charts, equipment and performance check lists, operations and trouble charts and references complete the manual.

PB 22080. U. S. WAR DEPARTMENT. Splicer PH-321. (Tech Manual 11-2392) May 1945. 36 p. Price: Microfilm-50¢ - Photostat-$3.00
The film-splicing machine described in this manual consists of a splicer unit, two service tables, a waste receptacle, a rewinder, and film holder. The splicer unit has four cutter blades operated by pedals. The equipment is mounted on a pedestal base of sufficient size and weight to prevent tipping or tilting. The splicer is designed to cut and cement together lengths of positive motion picture film to form a continuous film. The splicer accomodates 35- and 16-mm sound and silent film and 8-mm silent film. Instructions are included for operation, maintenance and repair of the equipment. Photographs, diagrams, check lists, trouble charts, and lubrication orders illustrate the text.

PB 22076. U. S. WAR DEPARTMENT. Theodolites PH-BC-33, PH-BD-33, PH-BE-33, PH-BF-33, PH-BG-33, PH-BH-33, and theodolite ML-194/TVQ-1. (Tech Manual 11-2634) Jun 1945. 200 p. Price: Microfilm-$2.00 - Photostat-$14.00
The various theodolites are discussed in detail and instructions are given for installation and assembly, for maintenance and repair. Photographs, diagrams, and charts illustrate the text and lubrication orders are appended. These theodolites are phototheodalite instruments which measure the horizontal and vertical angles of a point and record a picture of that point and the measurements of its angles on photographic film. They differ from the ordinary transit theodolite in the following major modifications: (1) The telescope is the so-called broken axis or elbow types instead of the straight type; (2) the angles are measured in mils instead of degrees and are indicated on mechanical counters instead of by reference to a graduated scale; (3) a 35-mm motion camera is built in so the center of the picture it takes continually coincides with the center of the field of view of the telescope. A list of references is appended.

PB 22066. U. S. WAR DEPARTMENT. Training film and film strip projection. (Tech Manual 11-401) Mar 1943. 79 p. Available from the Supt. of Documents, Washington 25, D. C. Price: 25¢
This manual provides instruction for the correct use, maintenance and storage of training film and projection equipment. The 16-mm training film projectors and the 35-mm film strip projector are used in service command headquarters, unit headquarters, and replacement training centers. The four types of 16 mm. projectors used in the Army training program are: Ampro YA; Phonofilm; Bell & Howell; and R.C.A. The complete projector usually comes in two cases, a projector case and a speaker case. The film strip projector which is manufactured by the Society for Visual Education is equipped for slide projection as well as film strip projection. The manual describes all equipment in detail and explains the setting up of each machine. It also gives practical suggestions about rooms to be used for projection. Photographs illustrate the manual. Appendices data on screen tables, trouble chart and parts list.

PB 21938. U. S. WAR DEPARTMENT. SIGNAL CORPS. Camera PH-195-A and camera equipment PH-205. (Tech Manual 11-2365). Jan 1945. 42 p. Price: Microfilm-50¢ - Photostat-$3.00
This manual describes an 8 x 10 studio view camera and the equipment for use with this camera. Complete instructions are given for preparing the equipment for use and for operating and maintaining the camera. Instructions are given for camera repairs. The manual also contains a maintenance list of parts. Photographs illustrate the camera and all parts of the equipment.

PB 19780. WILLIAMS, J. and BISHOP, F. H. Operating instructions and description of the Eastman experimental model 1-meter infantry range finders, T-26 and T-26. Feb 1944. 13p. Price: Microfilm-50¢ - Photostat-$1.00
Drawings are attached showing the optical system of the superimposed-image type range finder and the optical system of the invert split-field coincidence type range finder, including plan view of coincidence prism assembly and field of view. After removing the range finder from the carry case, and before attempting to set range, the operator is instructed to check the adjustment of the instrument as indicated in photographs 3, 4 and 5 also attached.

RUBBER AND RUBBER PRODUCTS

German

PB 19678. CAMERON, A. Production of acrylonitrile at Leverkusen plant of I.G. Farbenindustrie. (BIOS Final Rept 92, Item 22). Jan 1946. 10 p. Price: Microfilm-50¢ - Photostat-$1.00
This report supplements previous information on the production of acrylonitrile from acetylene and hydrocyanic acid. Photographs and brief explanations are given of the hydrocyanic acid generator and the upper part of the reactor. A flow sheet of the reaction system is shown and a diagram and a brief explanation given of the recovery of the acrylonitrile. The composition of the cuprous chloride catalyst is noted.

PB 20068. GAY, GLEN. Gummiwaren fabrik Phoenix, Harburg/Hamburg. (BIOS Final Rept 173, Item 22). Feb 1946. 6 p. Price: Microfilm-50¢ - Photostat-$1.00
This report describes the manufacture of rubber footwear at this plant. Buna S, 38 and 83 have been used. Typical formulas included.

PB 17362. I. G. FARBENINDUSTRIE, LUDWIGSHAFEN. Butyl - Phenol - Anlage (Butyl-phenol plant). (MIS 67b13 7002430). Aug-Dec 1944. 30 p. Price: Microfilm-50¢ - Photostat-$2.00
This folder contains copies of correspondence exchanged between the I. G. Farbenindustrie with the Chemische Werke Mils, G.m.b.H., and others in regard to motors and other installations needed for the temporary butyl phenol plant established by the I. G. Farbenindustrie under the name of Buna Werke, G.m.b.H., at Schkopau.

PB 16372. I. G. FARBENINDUSTRIE. Hochwertiger vulkanisierbarer kautschukersatz (High-grade vulcanizable rubber substitute). (Enlargement print of part of microfilm) May 1931 - Feb 1936. 20 p. Price: Microfilm-50¢ - Photostat-$2.00
The products which are obtained in the emulsion polymerization of butadiene are purified by extraction or reprecipitation and then blended with difficulty or non-volatile organic compounds or their mixtures. Such latter compounds are mineral, vegetable, or animal oils, fats, and waxes as well as the residues occuring from their treatment, also resins, resin acids and bitumens. Proper choice of the ratio of polymeric hydrocarbon to this latter compound may lead to durable substitutes of raw rubber as desired for the manufacture of automobile tires, conveyor belts, and other technical rubber goods. These documents constitute correspondence with respect to a patent application. In German.

PB 16385. I. G. FARBENINDUSTRIE. Konzentrierungsverfahren. (Method of concentration). (German patent application I57318 IVe/39b(4/01); Part of microfilm print enlargement 182-4) May 1942. 2 p. Price: Microfilm-50¢ - Photostat-$1.00
The method is intended for concentration of emulsions of butadiene polymers which contain alkyl naphthalene sulfonic acids and cannot, or can only with difficulty, be concentrated by mechanical operations. After cooling the emulsions at temperatures between 0° and 15°C, separation can be performed by centrifuging, filtering, or pressing. This application was made Mar 4, 1937. In German.

PB 17347. I. G. FARBENINDUSTRIE. Perduren G: Aufbau der mischungen und richtlinien für die verarbeitung. (Perduren G: Composition of the mixture and instructions for manufacture). (Enlargement print of part of microfilm 180-2) Apr 1937. 23 p. Price: Microfilm-50¢ - Photostat-$2.00
This report describes quite fully the various aspects of Perduren G manufacture and use, this substance being used to produce rubber goods which withstand swelling. The substances and fillers such as carbon black, zinc oxide, sulfur, stearic acid, accelerators, etc., which are added to the basic plastic, are noted and their influence on the Perduren tabulated. The finishing process is described. Results of aging tests, tensile tests and others are also given. Perduren G is especially resistant to ozone.

PB 16338. I. G. FARBENINDUSTRIE. Physikalische bedeutung der in den prüfberichten mitgeteilten werte. (Physical significance of the figures stated in testing reports.) (Enlargement print of part of microfilm 182-5) Jan 1943. 5 p. Price: Microfilm-50¢ - Photostat-$1.00
Leaflet of the division for the testing of buna rubber which explains the symbols, terms, methods, and machinery used in the examination of the raw materials, mixtures, and vulcanizates, which go into the manufacture of synthetic rubber. In German.

PB 17346. I. G. FARBENINDUSTRIE. Physikalische daten für isopren. (Physical data for isoprene). (Enlargement print of part of microfilm 180-2) Mar-Sep 1928. 4 p. Price: Microfilm-50¢ - Photostat-$1.00
The data given appear to be derived from previous letters written by Prof. W. Roth to the ammonia laboratory. The heat of combustion and the heat of evaporation are given. Data for butadiene, isoprene and dimethyl butadiene are noted. A butadiene vapor pressure curve is shown.

PB 16384. I. G. FARBENINDUSTRIE. Verfahren zur darstellung kautschukartiger massen (Method for production of rubber-like compositions). (Enlargement print of part of microfilm 182-6) Nov 1932. 5 p. Price: Microfilm-50¢ - Photostat-$1.00
Use of dichlorobutylene instead of 1.3 butadiene as starting material with subsequent separation of 1 mol of hydrochloric acid and formation of 1-chlorobutadiene was described in the intended patent application covered in PB 16386. For the next step one of the following methods is used: Autopolymerization, heat polymerization, sodium polymerization, emulsion polymerization, and polymerization by irradiation. This document is also a rough draft for a patent application. In German.

PB 16345. I. G. FARBENINDUSTRIE. Verfahren zur herstellung von formkörpern. (Process for manufacture of molded bodies). (Enlargement print of part of microfilm 182-5). Dec 1942-Feb 1944. 6 p. Price: Microfilm-50¢ - Photostat-$1.00
Brittle to powdery emulsion polymers of butadiene hydrocarbons are finely ground and with addition of fillers vulcanized under pressure in closed molds or upon rolls without previous plasticizing. This information comprises the claim of an intended patent application. The letter of Feb. 19, 1944 indicates withdrawal of application I73919 IVe/39b. In German.

PB 16386. I. G. FARBENINDUSTRIE. Verfahren zur herstellung von kautschukartigen massen. (Method for production of rubber-like compositions). (Part of microfilm print enlargement 182-6). Nov 1932. 3 p. Price: Microfilm-50¢ - Photostat-$1.00
After converting methane successively into acetylene, acetaldehyde, butylene glycol, and butadiene, then dichlorobutylene is produced by chlorination, 1 mol of hydrochloric acid is separated, and the resulting product polymerized in the usual way. This is the rough draft of a patent application. In German.

PB 16341. I. G. FARBENINDUSTRIE. Verfahren zur herstellung von kunstlichem kautschuk (Method for production of artificial rubber). (Enlargement print of part of microfilm 182-6). Mar 1942. 4 p. Price: Microfilm-50¢ - Photostat-$1.00
Polymerization of mixtures of isoprene with a vinylethynyl alkyl carbinol and acrylonitrile or methacrylonitile in aqueous emulsion leads to artificial rubber. This document was intended as the basis for a patent application. In German.

PB 16380. I. G. FARBENINDUSTRIE. Verfahren zur herstellung von mischpolymerisaten. (Process for manufacture of mixed polymers.) (Enlargement print of part of microfilm 182-6) Nov 1936-May 1942. 25 p. Price: Microfilm-50¢ - Photostat-$2.00
This document contains material relative to I.G. patent application I56785 IVe/39b, I.G. reference number 9734. The manufacture of rubber-like polymerization products polymerized of mixtures of vinylethinylcarbinols and butadiene hydrocarbons or substitution products of the latter is described together with results of tests made on various mixtures.

PB 16318. I. G. FARBENINDUSTRIE. Verfahren zur herstellung von mischungen aus vulkanisierbaren kunststoffen. (Method for the manufacture of mixtures consisting of vulcanizable artificial materials.) (Enlargement print of part of microfilm 182-5) Apr 1937. 15 p. Price: Microfilm-50¢ - Photostat-$1.00
So called butadiene resins manufactured according to German patents 539589 and 540998 can advantageously be used as additions to mixtures of synthetic rubbers. They facilitate the treatment of the mixtures in rolls and kneaders, favor the dispersion of carbon black, and improve the physical values of the corresponding vulcanizates. In general 4-15 parts of admixing material are added to 100 parts of polymer. This document is an intended patent application. In German.

PB 16349. I. G. FARBENINDUSTRIE. Weichungsmittel oder füllstoffe für kautschuk oder kunststoffe. (Plasticizer or filler for rubber or artificial material) (Enlargement print of part of microfilm 182-5) Nov 1938. 11 p. Price: Microfilm - 50¢ - Photostat - $1.00
German patent 702 660, class 39 b, group 507, issued Feb 13, 1941, for the application of the high molecular the not undecomposed, distillable fractions of hydrogenation products, or of their residues, as filler or plasticizer for rubber or synthetic rubber. Correspondence both prior and subsequent to issuance attached. In German.

PB 16333. KLUCKOW, P. Laboratoriumsverfahren zur unterscheidung von natürlichem kautschuk und seinen austauschprodukten. (Laboratory procedure for the distinction of natural rubber and its substitutes). (Enlargement print of part of microfilm 182-5) n. d. 7 p. Price: Microfilm-50¢ - Photostat-$1.00
The detailed description of characteristics and tests is divided into those for the various kinds of natural and artificial rubber, those for vulcanized finished products, and those for nonvulcanizable soft rubber-like artificial materials. In German.

PB 17564. LIVINGSTON, J. W. Oppanol (polyisobutylene) manufacture at the Oppau Farben Works. (U.S. Off of Mil Govt for Germany, FIAT, Final Rept 606). Dec 1945. 8 p. Price: Microfilm-50¢ - Photostat-$1.00
This report is an investigation of the production and control of oppanol B, or polyisobutylene which was used by the Germans as a natural rubber substitute for manufacturing cable, impregnating fabrics, for adhesives and for waterproofing. Oppanol was superior to natural rubber for many applications because it is not affected by light.

PB 19857. YOUKER, M. A. and COPELAND, N. A. German neoprene. (FIAT Final Rept 719). Jan 1946. 30 p. Price: Microfilm-50¢ - Photostat-$2.00
This typewritten report mainly describes production at Hoechst of mono-vinyl-acetylene (MVA), its chlorination to form 2-chloro-13-butadiene (chloroprene or CD) and the polymerization of DC to form neoprene. Chloroprene and neoprene were considered by some German investigators to be superior in some respects to Buna. However, plant rivalries and Buna commitment limited neoprene production to pilot plant size and development. Flow sheets show the various steps in the production of MVA from acetylene and the chlorination of MVA to form CD. In the chlorination process only about 20% MVA used was chlorinated in one pass, so as to limit formation of byproducts. A high boiling oil was removed as soon as it formed since it helped convert CD to dichlorobutylene. The gases were also treated to obtain additional CD. A formula for the polymerization at Hoechst is given and the polymerization process described. In general, Elmo pumps were used for handling acetylene or MVA. Doctor Wollthan at Hüls described some work done at Oppau and said that Oppau was primarily concerned with the synthesis of MVA as a basis for aliphatic chemicals and butadiene. Two plants at Zlin in Moravia which had been taken over by the Germans were visited. These produced about 60 tons of chloroprene per month but had capacity for only 30 tons of the polymer. A batchwise, emulsion polmerization process was used. No details were obtained regarding the polymerization but samples of chloroprene and neoprene were found either more pure or better than that produced by Hoechst. Not much work was done in Germany on stabilizers for neoprene. Experiments to produce good copolymers with chloroprene were not successful. Neoprene though was found to "weld" very well and was recommended for tire carcasses. Germans impregnated paper to make a good synthetic leather substitute. Curing bags for rubber tires made of neoprene lasted twice as long as natural rubber curing bags. Neoprene was also used for gaskets, packing, the cementing of rubbers, for coating metals, textile fibers and textile coating. Bibliography.

Italian

PB 4556. LARSON, LESLIE L. and SANDERS, P. W. Italian protective rubber gloves. (CWS Captured Materiel Tech Rept 43) Dec 1943. 6 p. Price: Microfilm-50¢ - Photostat-$1.00
This technical report describes two types of latex dipped rubber gloves having a high resistance to liquid mustard. The physical characteristics and functional characteristics discussed indicate that the gloves are comparable to the U.S. equipment. A chart showing physical properties of Italian rubber gloves and average comparable U. S. equipment complete the report.

Japanese

PB 22368. SMITHERS (W.L.) LABORATORIES. Examination of enemy materiel (OD-113; AC-77): Examination of Japanese aircraft tires and tube. Progress Report 124, Sep 14, 1944. (OSRD Rept 4280) Oct 1944. 14 p. Price: Microfilm-50¢ - Photostat-$1.00
This report covers the examination of two Japanese aircraft tires and one inner tube for composition and quality of the rubber and fabric. The tires and tube are made from compounds of natural rubber, and are serviceable but show nothing spectacular in construction, and only average quality. A discussion of the testing is followed by tables of tire and tube specifications, physical test results, oxygen bomb aging, and tear, rebound and flexibility tests. Photographs and drawings are included.

PB 22000. SMITHERS (W.L.) LABORATORIES and COLUMBIAN CARBON COMPANY. Examination of enemy materiel (OD-113) (AC-77)(M-119): Metallurgical examination of tire and tube from Japanese plane "Frances". Progress report 166, May 24, 1945. (OSRD Rept 5331; War Metallurgy Committee Rept M-564). Jul 1945. 13 p. Price: Microfilm-50¢ - Photostat-$1.00
The fabric used in this tire was cotton of standard 5/3 construction, of comparatively good breaking quality. The compounds were very mediocre. While no tests were made to determine the type of rubber used, it is assumed that it was natural rubber. Adhesion between various parts of the tire was good, but not exceptionally so. The tensile strength of the tread at 3170 lbs. was very mediocre; elongation was exceedingly low; resistance to abrasion was not good; and tear resistance was poor. The report states that American manufacturers could find nothing in the construction, design, or compounding of this tire that would be of help to them. It appears that the Japanese were unable to make efficient use of the good grade of materials which apparently were available. The physical and chemical analyses of the stock of the inner tube were satisfactory. Because the tube was almost destroyed a study of its over-all appearance could not be made. Tire and tube specifications and results of special tests on the tire stock are given in tabular form. Photographs and microphotographs are included. This examination was made at Battelle Memorial Institute.

United States

PB 22281. KNIGHT, RICHARD B. Development of army type dust respirator. (CWS Tech Div Memo Rept 319) Sep 1941. 28 p. Price: Microfilm-50¢ - Photostat-$2.00
Procedures and findings of tests to develop a satisfactory dust respirator are described. It is concluded that the latest model dust respirator E1R4 is comfortable; that it effectively seals at its periphery to the face of the wearer, thus preventing the entrance of unfiltered dusty air; that a suitable felt filter, when sewed to the outside surface of the faceblank will produce a satisfactory dust respirator that resists dust penetration; that the body of the respirator consists only of flexible materials that enhance comfort and permit carrying in a pocket without undue bulkiness; and that the respirator fits fairly close to the face all around so that projecting parts to catch on objects are at a minimum. Photographs are included.

PB 24894. U. S. NAVY DEPARTMENT. Cement; synthetic and reclaim rubber. (Navy Aeronautical Specification C-150) Feb 20, 1946. 16 p. Price: Microfilm-50¢ - Photostat-$2.00
The specification given here includes three types of cement: Type 1, General purpose, reclaim rubber or equivalent; type 2, Oil resistant, neoprene or equivalent; and type 3, Aromatic fuel resistant, buna-N or equivalent. The specification covers material and workmanship, detail requirements, methods of sampling, inspection, and tests; packing, packaging and marking for shipment. These three cements will cement duck, leather, felt, cork, and similar materials to each other or in combination. They will also cement the

above materials to aluminum alloy, steel, laminates, wood, and flat sheets of transparent plastic. Type 1 cement will not resist oil or gasoline; type 2 will resist oil but not fuel; type 3 will resist both fuel and oil. Diagrams illustrate the specification.

TRANSPORTATION EQUIPMENT

AERONAUTICS

Aircraft

German

PB 22927. BIOT, M. A. Aircraft vibration and flutter research in Germany. (Naval Tech Mission in Europe Tech Rept 364-45) Oct 1945. 68 p. Price: Microfilm-$1.00 - Photostat-$5.00
A survey of important lines of development and research on vibration and flutter in Germany during recent years was obtained from centers of research and interrogation of German design specialists. A description of the organization of the Junkers group, their flutter flight testing and model testing, and an appended paper on "Methods of flutter investigation in Germany especially at Junkers" by Dr. Ing. J. Doerr and Ing. R. Melser, represents Junkers research. A description of the organization of the Dornier research and calculation group, and their development of ground shake tests, flutter flight testing and landing gear vibration research, is next given, followed by the Goettingen group and their research on vibration problems of helicopters. Also described is the work of the Focke-Achgelis research on helicopter vibration. Two discussions given as appendices, are "Methods of flutter investigation in Germany, especially at the Messerschmitt Corporation," by Dr. Ing H. Voight, and "The flutter calculations for the ME-262 in the course of its development," by Ing F Nuernberg. A bibliography of 63 applicable German reports, together with the location of some of the reports, is given. Graphic design data is included.

PB 14576. BUNGARDT, W. Physikalische untersuchungsverfahren (Physical testing methods). (Reichsluftfahrttechnik II C 9). (ALSOS Mission, Klotter File 11B). Oct 4, 1937. 20 p. Price: Microfilm-50¢ - Photostat-$2.00
This is one of a series of pamphlets issued by the German Air Ministry. The author views the various methods and equipment by which aircraft construction materials can be tested physically. A few tests for wood are mentioned briefly; most tests mentioned are for metals. Definitions and formulas are given and the methods and importance of the tests discussed. Thermal tests, conductivity, ductility and electromagnetic tests are described. Tables, diagrams and bibliography are included.

PB 14580. DAEVES, K. Grosszahl-untersuchungen bei der werkstoffüberwachung (Large scale testing for checking of materials). (Reichsluftfahrtministerium, Ringbuch der Luftfahrttechnik II C 13). (ALSOS Mission, Klotter File 11 B). Apr 5, 1938. 10 p. Price: Microfilm-50¢ - Photostat-$1.00
This publication is one of a series issued by the German Air Ministry. The necessity of larger scale testing of materials to assure the required quality is analysed in this discussion. The use of large scale testing in acceptance of materials and determining proper values for specification is also stressed. The article contains graphs and a bibliography.

PB 20304. KÜSSNER, H. G. Flügel und leitwerkflattern (Reichsluftfahrtministerium, Ringbuch der Luftfahrttechnik, I A 6). (Wing and control surface-flutter). Feb 1937. 25 p. Price: Microfilm-50¢ - Photostat-$2.00
This report is primarily concerned with the phenomenon of flutter and its particular characteristics. It explains the experimental and mathematical procedures for the examination of flutter as to theory and practical application. Precautions to be observed in the prevention of flutter are listed in this report. Tables, graphs, drawings, and bibliography are included. This is one of a series of pamphlets in German by the German Air Ministry.

PB 20303. MEWES, E. Luftwiderstandsmessungen an schwimmwerken (Reichsluftfahrtministerium, Ringbuch der Luftfahrttechnik, I A 5). (Drag measurements on floats). Feb 1937. 6 p. Price: Microfilm-50¢ - Photostat-$1.00
This pamphlet is one of the series issued by the German Ministry of Aviation and discusses factors influencing amount of drag of floats and seaplane hulls. Test results are given in this contribution as well as calculations of aerodynamic characteristics of seaplanes and floats. Drawings, graphs, and bibliography are included.

PB 20301. MÜLLER, H. Einfluss des profiles auf die eigenschaften der polare (Influence of the profile on the properties of polar curves). Reichsluftfahrtministerium, Ringbuch der Luftfahrttechnik, I A 3) Feb 1937. 19 p. Price: Microfilm - 50¢ - Photostat - $2.00
This report deals with aircraft profile properties and gives mathematical calculations connected with that problem. The task of the airfoil is to provide necessary lift with very little air resistance. Strength and position of the resisting airflow are very dependent on the form of the profile. The properties of a profile can be predicted and plans can be drawn for profiles with certain properties. This document is one of a series issued by the German Ministry of Aviation. Graphs, a bibliography, and drawings are included in this text.

PB 20302. MUTTRAY, H. Die gegenseitige beeinflussung der einzelteile am flugzeug ohne laufende schraube (The mutual interference of the components of an airplane without the rotating propeller). Reichsluftfahrtministerium, Ringbuch der Luftfahrttechnik, I A 4) Apr 1937. 15 p. Price: Microfilm - 50¢ - Photostat - $1.00
This contribution deals with the mutual influence of components of an airplane without consideration of the propeller and the propeller wash. Other aspects of the above named subject are answered in other pamphlets of this series issued by the German Ministry of Aviation. This report deals only with the wings and fuselage: The term 'mutual' interference is defined in the text. Graphs, drawings, and bibliography are included.

PB 14567. PORGER, V. Gestaltung von seeflugzeugen (Form of seaplanes). (Reichsluftfahrtministerium, Ringbuch der Luftfahrttechnik I D 5). (ALSOS Mission, Klotter File 11 B). Apr 27, 1941. 17 p. Price: Microfilm-50¢ - Photostat-$2.00
The report discusses the form of seaplanes and gives examples of two types, the flying boat and the two pontoon types as most typical. There is a treatment of the bodies, wings and motors and comparisons are made between specific types. It is indicated that further increase in the size of seaplanes is possible. The report contains photographs, graphs, tables and bibliography and is one of a series of pamphlets published by the German Air Ministry.

PB 20299. SCHLICHTING, H. Einfluss der turbulenz und der Reynoldsschen zahl auf die tragflügeleigenschaften (Influence of the turbulence and the Reynolds number on the airfoil properties). (Reichsluftfahrtministerium, Ringbuch der Luftfahrttechnik, I A 1) Jan 1937. 12 p. Price: Microfilm - 50¢ - Photostat - $1.00
The object of the work described in this report is to explain the difficulties of the calculation of all forces on an aircraft. In the use of wind tunnel measurements for aircraft calculations it is necessary to notice that there is some difference between the Reynolds number of the model and that of the aircraft itself. In general the profile drag of the airfoils decreases with an increase of the Reynolds number. The lift coefficients at a small angle of attack are independent of the Reynolds number. This document is one of a series issued by the German Ministry of Aviation. The report includes graphs and a bibliography.

PB 22923. SCHLIESTETT, G. V. Index of Junkers wind tunnel test reports. (Naval Tech Mission in Europe Tech Rept 457-45) Oct 1945. 147 p. Price: Microfilm-$1.50 - Photostat-$10.00
A catalog of Junkers wind tunnel test reports, with a short summary of each, prepared by Herren Von Doepp and Fremzl of the wind tunnel research department at Junkers at the request of Mr. L. E. Root during the interrogation of Junkers personnel, covers the experimental work done since the beginning of 1940. The catalog is divided into 2 parts (1) reports of experiments on various types of existing or projected airplanes, arranged in chronological order beginning with the latest (2) experiments on airplane parts and investigations on aerodynamical questions not specifically applicable to a single model. It was customary in this plant to make first a "quick report" (E), then a "preliminary report" (S) which indicated volume of work and most important results, and superseded the quick one, and finally "revised diagrams" (D) containing the total results with corrections and revisions. During the last years of the war, the latter were not written, so the catalog indicates by letter which of the 3 types of report is available. During the time covered by this catalog, designations of reports were changed. Two sets of tables attempt to clarify their numerical series for S and D reports respectively and bring all reports on the same subject together. These tables indicate the chronological sequence of the preliminary and revised reports.

PB 22925. SCHLIESTETT, G. V. The work of the Aerodynamics Department, Graf Zeppelin Research Institute, Stuttgart-Ruit. (Naval Tech Mission in Europe Tech Rept 459-45) Oct 1945. 52 p. Price: Microfilm-$1.00 Photostat-$4.00
Cooperation between the aerodynamics and parachute departments of the Graf Zeppelin Research Institute resulted in the development of special chutes as landing and diving brakes for airplanes, non-oscillating personnel chutes and stabilising chutes for bombs, personnel, and for objects dropped from planes. Appendix I by Dr. Ing. H. Heinrich discusses the aerodynamic investigations of his department in airflow and its influence on oscillations of dome parachutes, and the design and testing of ribbon and stabilising parachutes. The use of stabilising chutes for mines, torpedoes and externally carried bombs is discussed. Photographs, graphs and charts are included. Some pages will not reproduce well. See also PB-22924 on the work of the parachute department.

PB 22924. SCHLIESTETT, G. V. The work of the Parachute Department of the Graf Zeppelin Research Institute, Stuttgart - Ruit. (Naval Tech Mission in Europe Tech Rept 460-45) Oct 1945. 61 p. Price: Microfilm-$1.00 - Photostat-$5.00
This report summarizes the work of the parachute department of the Graf Zeppelin Research Institute, which worked with the aerodynamics department in the developing of new and improved types of parachutes. These included landing brake chutes for the Ju-52, Ju-88, and Arado-234, dive brake chutes for the Do-217 and Ju-88 and dive and landing brake chutes for gliders. Appendix I, by Dipl. Ing. Theodor Knacke is a discussion of developments and investigations made by the parachute department, which worked on all chutes except the stabilising chute of Dr. Heinrich. Among the types worked on in addition to those above were ribbon chutes for personnel, salvage chutes for instruments etc., test plane chutes, chutes for various types of supply containers, bombs and mines dropped under specified conditions from specified heights. General research on problems of textiles, paper and paper coatings, unfolding impact, changeable drag areas and parachute fuses are discussed. Photographs, chart, diagrams, and graphs are included. See also PB-22924 on the work of the Aerodynamics department at this institute.

PB 22804. SHOEMAKER, J. M. Messerschmitt aircraft design development. (Naval Tech Mission in Europe Tech Rept 231-45) Aug 1945. 14 p. Price: Microfilm-50¢ - Photostat-$1.00
This report contains a brief summary of the developmental work being carried out by the Messerschmitt A.G. on high speed jet and tailless fighters at the close of the war. Model 1101 design was undertaken to meet Air Ministry requirements for a high performance jet fighter with high swept-back arrow wings, but calculated performance was less than desired so this model became a flight test plane for arrow-wings. Models 1106 and 1110 were next developed and the problems met are discussed. Studies of tailless jet fighters with arrow wings were undertaken in January 1945 in order to obtain better engine air intake, and P1111 and P1112 designs were undertaken but not completed at the time of the occupation. Data tables on P1101, P1110 and P1111 are given.

PB 20309. STÜPER, J. Die gegenseitige beeinflussung der einzelteile am flugzeug mit laufender schraube (The mutual interference of the components of an airplane with rotating propeller). (Reichsluftfahrtministerium, Ringbuch der Luftfahrttechnik, I A 12) Mar 1939. 26 p. Price: Microfilm-50¢ - Photostat-$2.00
The author studied as outstanding, the influence of the rotating propeller upon the wings. Through empirical observations and theoretical considerations a rule of thumb was developed by which the influence of the windstream on the wings could be calculated quite correctly. This is one of a series of pamphlets published by the German Air Ministry. The report is illustrated with graphs and drawings.

PB 20300. WEINIG, F. Die strahlkorrektur bei windkanalversuchen (Windstream correction in windtunnel experiments). Reichsluftfahrtministerium, Ringbuch der Luftfahrttechnik, I A 2) Jan 1937. 9 p. Price: Microfilm - 50¢ - Photostat - $1.00
The object of this report was to state corrections which are to be made in wind tunnel test results since measurements of air-flow made in a wind tunnel using a model indicate different conditions from those actually applying to the flying airplane, because of interference by the wind tunnel walls. This document is one of a series of pamphlets issued by the German Ministry of Aviation. The report includes drawings, graphs, and a 52-item bibliography.

PB 22822. WERTHEIMER, A. Water tunnels at AVA Gottingen and LFA Braunschweig. (Naval Tech Mission in Europe Tech Rept 382-45). Sep 1945. 5 p. Price: Microfilm-50¢ - Photostat-$1.00
There are three water tunnels at AVA Gottingen and one at LFA Braunschweig. The speed of water is about 5 m.s., and no satisfactory three-component balances are installed in any of the tunnels. These water tunnels were used primarily to observe and investigate nonstationary flows associated with flight of aircraft.

Japanese

PB 22390. GRISELL, L. H. and others. Examination of enemy material (CD-113; AC-77; K-119): Metallurgical examination of a tail wheel assembly and landing gear hydraulic retracting strut from a Japanese aircraft "Dinah". Progress report 141, Nov 3, 1944. (OSRD Rept 4465). Dec 1944. 17 p. Price: Microfilm-50¢ - Photostat-$2.00
Examination at the Battelle Memorial Institute of the material and construction of a tail wheel assembly and landing gear hydraulic retracting strut of a Japanese reconnaissance airplane is described in this paper. Inconsistencies in the choice and treatment of materials seem not to have economic or service requirements, but seem to be personal preference of the designer. A table of the parts examined is included giving type of material with metallurgical data, together with photographs showing the location of each numbered part. Table 2 gives the chemical analysis of steel, brass and bronze, and aluminum base samples from the assemblies.

PB 22396. GRENELL, L. H. and others. Examination of enemy materiel (OD-113; AC-77; N-119): Metallurgical examination of Oleo landing strut and wheel from Japanese "Sally", Mark II. Progress report 139, Oct 31, 1944. (OSRD Rept 4424). Dec 1944. 18 p. Price: Microfilm-50¢ - Photostat-$2.00
This report, from the Battelle Memorial Institute, describes the examination of the landing strut and wheel for type of material, heat treatment, and method of manufacture. The parts were made from steel, copper, aluminum and magnesium alloys, natural rubber and fiber. The conventional methods of fabrication were all utilized in producing the assembly, using good fabricating technique. The welding of numerous small parts together into assemblies is economical of man hours. A discussion of the procedure of examination is followed by tables, giving chemical analysis of the ferrous and nonferrous samples, detailed metallurgical data on the type of material, treatment and fabrication of each. Photographs of the strut, and its disassembly, showing numbered parts, are given.

PB 22380. GRENELL, L. H. and others. Examination of enemy materiel (OD-113; AC-77; N-119): Metallurgical examination of three Japanese aircraft landing hooks. Progress report 134, Oct 12, 1944. (OSRD Rept 4368. War Metallurgy Committee Rept M-419). Nov 1944. 29 p. Price: Microfilm-50¢ - Photostat-$2.00
These three Japanese landing hooks from naval aircraft "Zele", "Val", and "Hamp", were captured at Roi Island in the Kwajalein Atoll in February 1944 and from all outward appearances had never been used. The hooks were smaller and much lighter than similar American equipment because of the lighter aircraft employed. For this light service, excessive wear of the hook is not encountered and no provision is made for hard surfacing the hooks. Attention was given to weight saving by the employment of high-strength aluminum-zinc alloy type X768 and by the use of heat-treated built-up welded assemblies of alloy steel. The steel used is Cr-Mo and Ni-Cr-Mo alloy of electric furnace quality and very clean. Stress cracking of the X768 alloy was observed and would have caused failure of the hook in service. Natural rubber was employed for springs to retract the locking mechanism of the quick release used on two hooks. Included in this report prepared at Battelle Memorial Institute are discussions of economic considerations relative to manufacturing the hooks, photographs, microphotographs, and tabulated data.

PB 22334. HEUSSNER, C. H. and others. Examination of enemy materiel: Metallurgical examination of Japanese aircraft "Irving" airframe. Progress report 171, April 12, 1945. (OSRD Rept 5107) May 1945. 10 p. Price: Microfilm-50¢ - Photostat-$1.00
"Irving" is a late model Japanese night fighter and reconnaissance-type aircraft. Aluminum parts, with the exception of the wing sections, were manufactured from standard duralumin. A high-strength aluminum-zinc alloy (similar to Alcoa X768) was used for the wing sections. An addition of 0.20 percent chromium in these aluminum-zinc alloys suggests an attempt to inhibit stress corrosion. All of the aluminum alloys were heat-treated. Protective coatings on the aluminum parts consisted of cladding, anodizing, and painting. Both duralumin and Alcoa X768 type sheet were clad, anodized and painted. Extrusions, forgings and bar stock were anodized and painted. The cladding technique was good with little or no diffusion of copper or zinc into the clad layer. Paint coatings were phenolic-resin type varnishes with various colored pigments. Some primer coats of iron-oxide pigment in a phenolic varnish were noted. All of the steel parts were fabricated from alloy steels. Nickel-chromium-molybdenum steel, sometimes with tungsten and corresponding to SAE 4330, SAE 3330, and B. S. 865 aircraft steels, was used. Heat treatment appeared to consist of quenching followed by a high-temperature draw, which resulted in a hardness of about 250 VDH. A cadmium plate was applied to all of the steel parts for corrosion protection. Photographs and tables of detailed data are included. This report was prepared at Battelle Memorial Institute.

PB 22330. HEUSSNER, C. H. and others. Examination of enemy materiel: Metallurgical examination of two Japanese gasoline tanks from a "Judy" type aircraft wing. Progress report 167, Mar 20, 1945. (OSRD Rept 5021) May 1945. 11 p. Price: Microfilm-50¢ - Photostat-$1.00
The gasoline tanks were fabricated from 3 types of aluminum alloys. The braces, stringers, and supports were formed from an alloy similar to Alcoa 24S (Navy 46A9C), and the rivets from Alcoa 17S (Navy 43B5e) type alloys. The skin sections, however, were assembled from various sizes of sheet rolled from an alloy similar to Alcoa X76S. The X76S alloy contained chromium additions which tend to increase resistance to stress-corrosion. Construction of the tanks showed good workmanship. Riveting practice was generally satisfactory with occasional defects, such as excessive dimpling. Rivet designs and sizes closely followed United States specifications. The Japanese went to great lengths to protect the tanks from corrosion. The Alcoa X76S type and some of the Alcoa 24S type alloys were clad with an alloy similar to Alcoa 4S. All of the aluminum parts were anodized, and the exterior covered with a double coat of phenolic varnish. The primer coat of varnish had an Fe_2O_3 pigment, and the exterior coat an aluminum powder pigment. Photographs and tables of data are included. This investigation was carried out at Battelle Memorial Institute.

PB 22540. HEUSSNER, C. H. and others. Examination of enemy materiel (OD-113) (AC-77): Metallurgical examination of airframe sections from Japanese aircraft "Jill". Progress report 123, Sep 12, 1944. (OSRD Rept 4252; War Metallurgy Committee Rept M-391). Oct 1944. 13 p. Price: Microfilm-50¢ - Photostat-$1.00
Examination of the Japanese airplane showed that the wing spar extrusions and sheet were made from alloys similar to X76S. All other parts, with the exception of the control torque tube fitting which was machined from low carbon steel, were fabricated from Alcoa 24S type alloys. Alcoa 17S type rivets were found in these sections. Tensile tests yielded normal physical properties for the sections tested. The microstructures were typical for these alloys in the solution heat treated and aged condition. In the wing spar extrusion the grain size was coarse and the insoluble constituents were not aligned by the working of the metal. The skin samples, and the sheet from the #2 gas tank rib, the wing spars, and the #8 wing rib were clad with unalloyed aluminum. The thickness of the cladding material was approximately 5% of the thickness of each respective clad section. Some pit-type corrosion was found in the alclad coatings; however, none was sufficient to penetrate more than 50% of the protective layer. Anodized coatings were found on the extruded "T" and "L", and the rolled "Z" sections, the control torque tube, the inboard skin samples from the lower surface under the #3 gas tank, the sheet from the rib under the #2 gas tank, and on all the rivets. The paint coatings were of good quality. Test data are presented in tabular form. A photograph shows the parts examined.

PB 22385. HEUSSNER, C. H. and others. Examination of enemy materiel (OD-113; AC-77; N-119): Metallurgical examination of airframe sections from Japanese aircraft. Progress report 138, Oct 31, 1944. (OSRD Rept 4429. War Metallurgy Committee Rept M-429). Dec 1944. 14 p. Price: Microfilm-50¢ - Photostat-$1.00
This report prepared at Battelle Memorial Institute covers the examination of fifteen sections from the frame of Japanese aircraft "Lily", "Judy", and "Dinah" for type of materials and coatings, method of manufacture, and physical properties. The wing spar extrusions of "Judy" were made from alloys similar to X76S as was found on "Jill". All other aluminum parts were fabricated from Alcoa 17S and 24S type alloys. Rivets were made from Alcoa 17S duralumin. Microstructures and hardness levels were typical for these alloys in the solution heat-treated and aged condition. However, tensile yielded slightly lower physical properties than American standards. Alclad surfaces were of high purity. Lack of intercrystalline corrosion at corroded surfaces indicated good heat-treating practices. Anodizing coatings were found on a number of minor parts. Discussion of findings and economic considerations, photographs, and tabulated data are included. A description of a signal light from the wing of the "Judy" is also given.

United States

PB 4881. ANDERSON, H. L. and JACOBS, H. H. Determination of servo-rudder tab effectiveness (Five foot wind tunnel test no. 173) (AAF ATSC Tech Rept 4253) Sep 1936. 20 p. Price: Microfilm-50¢ - Photostat-$2.00
This test was made to determine the relative effectiveness of various sizes of servo-rudder tabs. The term "effectiveness" is interpreted as the ratio of yawing moment about the center of gravity to the tab hinge moment. The model used for the test was the AT-4 fuselage and horizontal tail. The report describes in detail the complete test, and contains: 1 table tabulated data, 4 diagrams plotted data, 1 sketch showing rudder and tabs as tested, 4 photographs, and 1 addendum.

PB 5332. KLIAS, BURTON A. Structural tests of the Fletcher plywood flap for the BT-13A airplane. (AAF ATSC Memo Rept EXP-M-51/Str278, Add 11) Mar 1942. 2 p. Price: Microfilm-50¢ - Photostat-$1.00
The purpose of this memorandum is to report the results of the static tests conducted on the Fletcher plywood flap for BT-13A airplane. Factual data on the test, conclusions, and recommendations complete this brief report in which it is recommended that these flaps be released for production.

PB 19813. GODFREY, H. J. The corrosion fatigue failure of aircraft control cables (M-101): The effect of metallic coatings and lubricants on fatigue properties of aircraft cables. Progress report 2, Nov 1, 1942 - Apr 30, 1943. (OSRD Rept 1525; War Metallurgy Committee Rept M-83) Jun 1943. 107 p. Price: Microfilm-$1.50 - Photostat-$8.00
The effect of metallic coatings and lubricants on the corrosion fatigue properties and internal friction of aircraft control cables was investigated at John A. Roebling's Sons Company and is reported herein. The results of the tests which are described demonstrated that the fatigue life of aircraft cables was greatly reduced by the corrosive action of a salt atmosphere. It was found that the corrosion fatigue life could be materially improved by the use of more heavily coated zinc wire or lead alloy coated wire. The tinned and lighter zinc coated cables offered less protection. The stainless steel cable was superior to all the carbon steel cables in a corrosive atmosphere. The use of internal lubricants increased the corrosion fatigue life of the cables. The protection offered by the rust preventive tested became more pronounced as the corrosive conditions became more severe. The heavier zinc coated cable developed the highest internal friction and the tinned coating the least. These results confirm the internal friction tests conducted by the American Steel and Wire Company and presented in Reports No. 33 and 33A which are included in the appendix of this report. Included also are tabulated results, plotted curves, drawings of testing equipment, and photographs of various types of cables after 12 hours exposure to salt spray. See also PB 19812, PB 19815, PB 19821, PB 19831 - 19832 and PB 19836.

PB 19812. GODFREY, H. J. Corrosion fatigue failure of aircraft control cables (M-101): The effect of sheave diameter on the fatigue life of aircraft cables. Progress report 3, Nov 1, 1942-Apr 30, 1943. (OSRD Rept 1610; War Metallurgy Committee Rept M-93) Jul 1943. 36 p. Price: Microfilm-50¢ - Photostat-$3.00
The fatigue and internal friction tests discussed in this report were conducted under normal laboratory conditions using sheave diameters 7, 9, 12 and 16 times the cable diameter. The effect of cable tension was also investigated in the internal friction tests. The results demonstrated that the fatigue life of aircraft cables is affected to a large extent by the size of the sheave over which the cable operates. The fatigue life of a 7x19 construction was considerably better than that of a 7x7 construction. The tests indicated that there is a critical sheave-cable diamter ratio below which the fatigue life is seriously reduced. The internal friction of the cables increased as the cable tension increased and as the sheave diameter decreased. This report which was prepared at the laboratory of the John A. Roebling's Sons Company, includes drawings of testing equipment, tables and plotted curves showing results of fatigue tests, and an appendix giving the results of tests made to determine the effect of load and pulley size upon the fatigue life of cable. See also PB 19813, PB 19815, PB 19821, PB 19831-19832, and PB 19836.

PB 19822. GODFREY, H. J. Corrosion fatigue failure of aircraft control cables (M-101): Fatigue tests under service loads. Progress report 5, Jan 1, 1944-Nov 30, 1944. (OSRD Rept 4543; War Metallurgy Committee Rept M-439) Dec 1944. 93 p. Price: Microfilm-$1.00 - Photostat-$7.00
The fatigue tests reported herein were conducted under normal laboratory conditions on a new large cable fatigue testing machine which was designed to test cable in a similar manner as designated in Specification AN-RR-C-43. The cable loads, however, were applied by means of a hydraulic loading system which had a maximum capacity equal to a 4000 pound cable tension. The results of the tests indicated that the fatigue life of aircraft cables was affected to a large extent by the loads and sheave diameters. The results are discussed in detail and are presented in numerous tables. Included also in this report, which was prepared at the John A. Roebling's Sons Company, are drawings and photographs of the testing equipment, and plotted curves showing results of fatigue tests on various types of cables under various conditions, and a report of the Douglas Aircraft Manufacturing Company, Inc., entitled "Cable Friction and Life Strength Test." See also PB 19812-19813, PB 19815, PB 19821, PB 19831-19832, and PB 19836.

PB 19836. GODFREY, H. J. Corrosion-fatigue failure of aircraft control cables (M-101): Final report, May 1, 1942 - Dec 31, 1944. (OSRD Rept 4819; War Metallurgy Committee Rept M-467) Feb 1945. 48 p. Price: Microfilm-50¢ - Photostat-$4.00
This is a summary of the work undertaken at the laboratory of John A. Roebling's Sons Company on the physical properties of aircraft control cables under conditions of testing which were designed to reproduce service conditions, particularly those experienced by naval aircraft. The fatigue, fatigue-corrosion, and internal friction tests and the type of cables and lubricants tested are described, and the important findings are discussed briefly. Table I shows results of AN-RR-C-43 acceptance fatigue tests on various cables. Table II shows the effect of load on fatigue life on AN-210 Micarta sheaves. Included also are plotted curves and photographs showing the effects of 12 hours of salt spray exposure on various types of cables. For detailed information see progress reports, PB 19812-19813, PB 19815, PB 19821, PB 19831, and PB 19832.

PB 19821. GODFREY, H. J. Corrosion fatigue failure of aircraft control cables (M-101): Miscellaneous tests. Progress report 6, Jan 1, 1944-Dec 31, 1944. (OSRD Rept 4603; War Metallurgy Committee Rept M-452) Jan 1945. 56 p. Price: Microfilm-$1.00 - Photostat-$4.00
The fatigue life of aircraft cables before and after heating to 160° F. was found to be affected by the type of lubricant in the cables. The corrosion-fatigue and low temperature fatigue life were reduced if the cable lubricant dripped from the cable during the prior heating. The AN-RR-C-43 acceptance fatigue tests showed that the fatigue life of cables would be impaired if the cable lubricant did not penetrate into the center of the cable strands. Paraffestone (AN-C-52) was beneficial to the corrosion-fatigue life of cables, but at -65° F. it became brittle and flaked off the cable. The internal friction of galvanized cables decreased with use. Tinned cables had a considerably lower internal friction than galvanized cables and the friction remained constant with use. A few German and Japanese cables were investigated and were found to be inferior in quality to cables made in the United States. Included in this report, which was prepared at the laboratory of the John A. Roebling's Sons Company, are descriptions of the experimental work, tables showing results, a diagram and photographs of the testing equipment, plotted curves, and photographs of German and Japanese cables. See also PB 19812-19813, PB 19815, PB 19831-19832, and PB 19836.

PB 19831. GODFREY, H. J. Corrosion fatigue failure of aircraft control cables, (N-101): The effect of metallic coatings and lubricants on the fatigue and internal friction properties of aircraft cables. Progress report 4, May 1, 1943 - Dec 31, 1943. (OSRD Rept 3346; War Metallurgy Committee Rept M-207) Mar 1944. 92 p. Price: Microfilm-$1.00 - Photostat-$7.00
The fatigue and internal friction tests described in this report were conducted at room temperature with and without corrosion, and at -65°F. without corrosion. The cables were tested over sheaves having a diameter 12 times the cable diameter. The cable tension for the fatigue tests was approximately one percent of the cable strength and for the internal friction tests ranged between one percent and seven percent of the cable strength. The corrosion-fatigue tests and the fatigue tests at -65° F. indicated that 18-8 stainless steel is the best material for aircraft cables. At room temperature, without corrosion, carbon steel cables were equal to or better than the stainless steel cable. The heavy galvanized material was the best of the carbon steels in the corrosion-fatigue tests. Other results are given in this report which was prepared at the laboratory of the John A. Roebling's Sons Company. Included also are drawings of testing machines; plotted curves illustrating results of fatigue tests, internal friction tests; and corrosion-fatigue tests; and numerous tables showing results. See also PB 19812 - 19813, PB 19815, PB 19821, PB 19832 and PB 19835.

PB 5330. HABER, B. D. Structural tests of the Fletcher BT-13A plywood ailerons and aileron tabs. (AAF ATSC Memo Rept EXP-M-51/Str278, Addendum 4) Jan 1942. 2 p. Price: Microfilm-50¢ - Photostat-$1.00
The purpose of this memorandum is to report results of the static tests conducted on the Fletcher plywood aileron and aileron tab for the BT-13A airplane. It is recommended that these parts be released for full production.

PB 5314. HARDY, W. L. Oil test (lubricating) multi-cylinder engine, power plant oil No. 232, Test No. 3. (AAF ATSC Tech Rept 4935) May 1943. 51 p. Price: Microfilm - $1.00 - Photostat - $4.00
These tests were made to determine the characteristics of lubricating oils No. 232 and 205, in a single row, radial air-cooled engine, designated as R-975-7. This report comprises one 50-hour endurance run with lubricating oil No. 232. This report gives record of test, analysis of results, and contains: 1 performance chart, 10 engine inspection tables, 21 log tables, 7 engine stop tables, 1 chart engine data, 1 chart engine test data, 1 table new and used oil analysis, and 2 tables engine deposit analysis.

PB 4867. JACOBS, H. H. Test of 1/60 scale model of type C-6 observation balloon with split rudder, five foot wind tunnel test no. 162. (AAF ATSC Tech Rept 4194) Mar 1936. 36 p. Price: Microfilm-50¢ - Photostat-$3.00
The test was made to determine the aerodynamic suitability of a split rudder which was intended for use on the C-6 observation balloon, instead of an air-inflated lobe. The report gives a detailed description of the tests, and contains: a complete wind tunnel nomenclature, - 5 tables of tabulated data, - 10 diagrams plotted data, - 5 vector diagrams, - 3 photographs of the C-6 observation balloon model, - and 1 sketch of the model. The test indicated that the split rudder provided less directional stability about the center of rotation than the lobe, but full scale tests are recommended before a definite decision is made.

PB 4876. KELLHOFER, ROBERT W. Report of static and dynamic tests conducted on Consolidated PB-2A airplane. (AAF ATSC Tech Rept 4221) Aug 1936. 86 p. Price: Microfilm-$1.00 - Photostat-$6.00
The Consolidated PB-2A was designed and built by the Consolidated Aircraft Corporation, at San Diego, California. It was tested to determine its structural strength when subjected to the static and dynamic loads specified by the Air Corps for pursuit planes. The tests included: The horizontal tail surfaces, - vertical tail surfaces, - fuselage, - wings, ailerons, - flaps, - overturning conditions, - and alighting gear. A detailed description of all tests is given, including 36 figures, - 3 photographs of the airplane, - and 13 photographs of the actual tests. It was concluded that all tests were satisfactorily met.

PB 4735. LEES, LESTER. Preliminary tests on the 1/20th scale partial model of the Wright Field combination high speed, high altitude wind tunnel. (AAF ATSC Memo Rept EXP-M-51/AR9-17) Jul 1942. 18 p. Price: Microfilm-50¢ - Photostat-$2.00
This memorandum reports the results of preliminary tests on the 1/20-scale model of the nozzle, test section, and diffuser of the projected Wright Field wind tunnel. (10-foot throat). A brief description of the apparatus, test procedure and methods utilized in the preliminary tests will be found in Appendix I. In Appendix II the preliminary tests are described in details including figures 1 to 5 inclusive. Conclusions and recommendations complete this report which recommended some design changes and continuation of scale model tests.

PB 19815. LEWIS, DARTREY. Corrosion fatigue failure of aircraft control cables (N-101): Effect of lubrication on fatigue properties. Progress report 1, Dec 11, 1942. (OSRD Rept 1137; War Metallurgy Committee Rept M-31) Jan 1943. 40 p. Price: Microfilm-50¢ - Photostat-$3.00
Results of tests described in this report demonstrated that lubrication of aircraft control cables was very essential for good fatigue life. The fatigue tests at sub-zero temperatures showed that the fatigue life of cables with three standard lubricants decreased considerably, whereas the low temperature lubricant tested retained its lubricating value and was better than the others at -65° F. The fatigue life of the cables with the three standard lubricants was found to be inversely proportional to the internal friction. This report of work carried on at the development laboratory of John A. Roebling's Sons Company includes discussions of results, tables showing the effect of temperature on lubricants, results of fatigue tests at various temperatures, results of internal friction tests; a diagram of the internal friction test frame, and plotted curves showing the effect of variation of lubrication and of temperature, and the relation of internal friction to tension load. See also PB 19812-19813, PB 19821, PB 19831, PB 19832, and PB 19835.

PB 5325. MCLEOD, M. K. The effect of altitude on power output as limited by detonation. (AAF ATSC Memo Rept EXP-57-531-222) Sep 1943. 7 p. Price: Microfilm-50¢ - Photostat-$1.00
The purpose of this memorandum is to report results obtained on single-cylinder engine tests and preliminary flight tests to determine the effect of altitude on power as limited by detonation. The report contains four plotted diagrams showing results of the various tests. It was found that there is a definite reduction in the maximum permissible power output of an engine as limited by detonation, as the exhaust pressure is reduced.

PB 4882. SECHLER, E. E. and NEWELL, J. S. Methods of analysis applicable to monocoque aircraft structures. Progress report. (AAF ATSC Tech Rept 4313 Rev I) Jan 1942. 289 p. Price: Microfilm-$3.00 - Photostat-$20.00
In revising this report, the purpose and scope of the work has been the same as that of the original work; namely, to survey the design procedures, both theoretical and empirical, which are applicable to the analysis of monocoque aircraft structures and to attempt a correlation of all existing test data in order to prove, disprove, or modify these procedures. In the three years that have elapsed since the publication of the original report, considerable progress has been made in the theoretical treatment of a number of the problems confronting the airplane designer. In addition, a large amount of experimentation has been carried out, either for the purpose of justifying certain design methods, or for the purpose of checking theoretical studies. In so far as it has

been possible, the pertinent results of these investigations have been included in this report. Each subject has been treated in a separate section with its own bibliography, the report contains 11 sections with 85 figures, list of symbols and Greek letters used, and Appendix A - testing and analysis methods.

PB 5551. STORBERG, RICHARD F. Static tests of Doak plywood rear fuselage section for AT-6A airplane. (AAF AFSC Memo Rept EXP-M-51/Str278, Add. 15) Mar 1942. 10 p. Price: Microfilm-50¢ - Photostat-$1.00
The purpose of this memorandum is to report the results of the static tests conducted on the AT-6A plywood rear fuselage section submitted by the Doak Aircraft Company, Inc. The report contains seven photographs showing static test setup and actual tests. A design change was recommended and release for production of the slightly changed fuselage was further recommended.

PB 4736. WILLIAMS, F. W. Study of proposed design of steel tunnel tube for the combination high speed high altitude wind tunnel. (AAF AFSC Memo Rept EXP-M-51/AR9-9) Jan 1942. 49 p. Price: Microfilm-50¢ - Photostat-$4.00
The purpose of this report is to present a general design for the steel tube of a wind tunnel, including graphs and formulae for use in calculating stresses in members and determining sizes of members in this general design and to apply the graphs and formulae to the proposed combination high speed, high attitude, wind tunnel project so that a more detailed design may be initiated and an accurate cost estimate made. Appendix 1 contains a detailed discussion of the various problems of tunnel tube design. Appendix 2 contains eight graphs for determining the size of various structual portions of the tunnel and five layouts of various typical portions. Appendix 3 with four figures shows application of equations and graphs etc. derived in appendices 1 and 2. Appendix 4 contains a cost estimate based on the design presented in this report.

Instruments

PB 22370. JACKSON, L. R. and others. Examination of enemy materiel (OD-113;AC-77): Metallurgical examination of a German aircraft course meter. Progress report 108, Sep 22, 1944. (OSRD Rept 4315) Nov 1944. 12 p. Price: Microfilm-50¢ - Photostat-$1.00
This report, from Battelle Memorial Institute, covers the examination of a German aircraft course meter for structure, composition and details of manufacture. All of the parts could be quickly made since they were either sawed or stamped from bar and sheet stock, or cast, molded or extruded. The discussion of the materials used in this precision instrument is followed by tables giving the chemical analysis, metallurgical data, information on method of manufacture, materials, and microstructure of each of the numbered components. Photographs of the instrument and of the disassembly showing components, are given.

PB 22523. JACKSON, L. R. and others. Examination of enemy materiel (OD-113) (AC-77): Metallurgical examination of a German airspeed indicator. Progress report 97, Jul 24, 1944. (OSRD Rept 4072; War Metallurgy Committee Rept M-356) Aug 1944. 10 p. Price: Microfilm-50¢ - Photostat-$1.00
The majority of parts from the German airspeed indicator were made of brass sheet, cut or stamped to shape. These were practically all nickel plated for corrosion resistance. The case of this instrument was a molded phenolic resin with a chopped cloth filler, and was very resistant to impact. The pivots were Ni-Cr-Mo steel, which in the case of the principal point had been hard surfaced, apparently by nitriding. The diaphragm was constructed of 25% Ni-brass (German silver), and the main spring was made of beryllium Contrasid. The movement of the instrument was fully jewelled. The figures on the dial and the pointer were luminous. A summary of properties and breakdown of parts in the indicator, including hardness, method of manufacture, microstructure, analyses and markings is given in tabular form. Photographs are included. This report is from the Battelle Memorial Institute.

PB 22376. JACKSON, L. R. and others. Examination of enemy materiel (OD-113; AC-77): Metallurgical examination of the instrument panel of a Junso 211-B direct gasoline injection engine from a Junkers-88 German bomber. Progress report 128, Sep 27, 1944. (OSRD Rept 4364) Nov 1944. 21 p. Price: Microfilm-50¢ - Photostat-$2.00
This report from the Battelle Memorial Institute covers the examination of a Junkers-88 bomber instrument panel, containing a propeller pitch indicator, an oil pressure gage, and an oil temperature gage, for structure, composition, and details of manufacture. Most of the instrument's parts were made of brass, low carbon cold-rolled steel, plastics or aluminum alloys. These were mostly in the form of bar stock, sheet, aluminum extrusions, or injection molded plastics, all with some form of surface protection. A discussion of the materials used is followed by tables of the chemical analysis of parts from the panel, metallurgical data, covering method of manufacture, microstructure, hardness, and some finishes of the various parts of the assemblies. Photographs of the instrument panel and the disassembled parts are included.

PB 22382. JACKSON, L. R. and others. Examination of enemy materiel (OD-113; AC-77; M-119): Metallurgical examination of a German aircraft fuel consumption meter and a blinker-type oxygen flowmeter. Progress report 137, Oct 30, 1944. (OSRD Rept 4422). Dec 1944. 19 p. Price: Microfilm-50¢ - Photostat-$3.00
A variety of iron, aluminum, copper, and nickel alloys were used in the German aircraft fuel consumption meter, while the blinker-type oxygen flowmeter was constructed mainly of stamped and extruded aluminum. The dials of both instruments were luminous, and neither meter contained jewels. No unusual materials or manufacturing processes were revealed in the examination of these instruments. This report prepared at the Battelle Memorial Institute contains additional description of these instruments, discussion of findings, photographs, and tabulated data.

PB 22383. JACKSON, L. R. and others. Examination of enemy materiel (OD-113; AC-77; M-119): Metallurgical examination of a gyro compass from a Japanese aircraft "Val" Mark I. Progress report 138, Oct 28, 1944. (OSRD Rept 4421. War Metallurgy Committee Rept M-425). Dec 1944. 14 p. Price: Microfilm-50¢ - Photostat-$1.00
Study of this Japanese gyro compass at Battelle Memorial Institute indicated that this instrument had been copied exactly from the Sperry directional gyro, as the part of the parts of the latter and the gyro compass were interchangeable. However, certain additions had been made in the Japanese instrument which were among the newer improvements in American gyros. These included the hollow end gyro rotor shaft for temperature adjustment and the curved lower vertical gimbal pivot to prevent brinnelling. Nearly all the parts of the Japanese instrument were made from mild or high carbon chromium steel, Muntz metal, or an aluminum-copper-silicon alloy. All parts were provided with some form of corrosion resistant coating, which are mentioned in the report. Discussion of findings, economic considerations, photographs, and tabulated data are included.

Engines and Propellers

PB 14590. BERG, H. H. Die untersuchung der abgaszusammensetzung bei flugmotoren auf dem prüfstand und im flugzeug (Tests for the analysis of exhaust gas of aircraft engines while in flight and on test stand). (Reichsluftfahrtministerium, Ringbuch der Luftfahrttechnik III B3). (ALSOS Mission, Klotter File 11C) Dec 31, 1937. 11 p. Price: Microfilm-50¢ - Photostat-$1.00
The efficiency of a combustion engine can be determined by an analysis of the exhaust gas. The composition of the fuel mixture must be known. Various methods of analysis are used

such as: (1) chemical absorption and analysis of gases; (2) mechanical - measurement of density and time of diffusion through porous partitions; (3) optical - spectroscopy; (4) electrical - conduction tests. Various types of test equipment are illustrated. The report contains drawings, graphs, photographs and a bibliography.

PB 22336. GRENELL, L. H. and others. Examination of enemy materiel: Metallurgical examination of a Japanese Kinsei - 43 aircraft engine. Progress report 170, Apr 14, 1945. (OSRD Rept 5109; War Metallurgy Committee Rept M-524) May 1945. 48 p. Price: Microfilm-50¢ - Photostat-$4.00
There has been surprisingly little change in the materials, alloys, manufacturing methods, and workmanship used in the construction of the two Kinsei engines manufactured late in 1942 and in late 1943. Critical alloys were used extensively, almost lavishly, to obtain the desired mechanical properties. The alloy steels analyzed were principally basic open-hearth, although some electric steel was used. All of the principal parts of the engine were highly alloyed and, except for a few parts such as the sun gear, connecting rods, and impeller shaft, the alloys were almost identical to those used in the earlier engine. The light metal parts showed good workmanship; the large forged pieces, such as the crankcase, were particularly excellent. Magnesium castings were again used extensively in the latter engine, although aluminum castings had been substituted for the cam housing, oil pump body, and the gear case. The manufacturing methods employed were satisfactory from a quality standpoint, although many of the operations employed would tend to slow production. Tables and photographs are included.

PB 22521. GRENELL, L. H. and others. Examination of enemy materiel (OD-113)(AC-77): Metallurgical examination of parts from a Japanese Sakae 12 engine. Progress report 90, Jul 18, 1944. (OSRD Rept 4065; War Metallurgy Committee Rept M-350) Aug 1944. 40 p. Price: Microfilm-50¢ Photostat-$3.00
Apparently great care was taken in the production of this engine for, with the exception of slight porosity in the Al-alloy castings, all of the parts were of good quality and were well-finished. The free use of Ni and Mo in the steels may indicate that the Japanese had an abundant supply of these alloying elements in 1942. The steels from which these aircraft parts were manufactured were probably made in basic open-hearth furnaces and were deoxidized with Al, Si and Ti. High Sn residuals indicated the use of large amounts of scrap in the furnace charges. Most of the ferrous parts were fabricated from alloy steels and were heat treated. The percentages of alloying elements, particularly Ni and Mo, were higher in these steels than in those commonly used in the U. S. An interesting feature noted was the .001" thick Cr plate on the compression ring of the piston. Conventional alloys were used in the nonferrous parts. The quality of the Cu-alloy castings was good, while that of the Al-alloy castings was only fair. One of the four parts cast and all of those forged from aluminum alloys were solution heat treated and aged: None were anodized. Cast phosphor bronze, steel-backed cast Cu-Pb, steel-backed Sn-base babbitt, and SAE 52100 roller bearings were used in this engine. The bonds between the bearing alloys and the steel backings were good. Tables of detailed data are given. Photographs and a diagram of hardness survey are included.

PB 22374. GRENELL, L. H. and others. Examination of enemy materiel (OD-113; AC-77): Metallurgical examination of parts from an Aichi V-12 Japanese aircraft engine. Progress report 121, Sep 9, 1944. (OSRD kept 4359) Nov 1944. 36 p. Price: Microfilm-50¢ - Photostat-$3.00
This report from the Battelle Memorial Institute covers the examination of 75 parts, including the block and crankshaft, from a Japanese Aichi V-12 aircraft engine. The Aichi resembles the German Mercedes-Benz DB-601 series, except in the valves, pistons and fuel injector nozzle. A discussion of unusual or typical metallurgical practices found on examination is followed by tables of markings found on the parts, metallurgical data, including raw stock, microstructure, analysis, and surface finish of parts, and by tables of the chemical analysis and of the tensile properties of several components. Photographs and photomicrographs are included.

PB 22381. GRENELL, L. H. and others. Examination of enemy materiel (OD-113; AC-77; M-119): Metallurgical examination of a Japanese Kinsei-43 aircraft engine. Progress report 127, Sep 18, 1944. (OSRD Rept 4420. War Metallurgy Committee Rept M-422). Dec 1944. 69 p. Price: Microfilm-$1.00 - Photostat-$5.00
Examination at Battelle Memorial Institute revealed that the metallurgical practices followed in the design and construction of this engine, which was captured at Attu Island in 1943, were good. The materials used were of excellent quality and no indication was observed of a desire to substitute for critical materials or to economize in any way. Alloy steels were extensively used. Aluminum parts, both cast and forged, were of excellent quality. The alloys chosen were similar to American practice, and heat treatment of the forged parts was fair. Magnesium castings were used extensively and formed a larger part of the total engine weight than in previously examined Japanese engines. Heat treatment of steel parts was used extensively. Descriptions of the component parts, discussions of findings and economic considerations, numerous photographs, and tabulated data are included in this report.

PB 22379. GRENELL, L. H. and others. Examination of enemy materiel (OD-113; AC-77; M-119): Metallurgical examination of Japanese propeller blades. Progress report 133, Sep 14, 1944. (OSRD Rept 4367. War Metallurgy Committee Rept M-418). Nov 1944. 10 p. Price: Microfilm-50¢. Photostat-$1.00
Examination at Battelle Memorial Institute showed that this propeller blade was hammer forged from an aluminum alloy similar to Alcoa 258. No unusual use of materials or methods of manufacture were evident. The blade showed excellent workmanship and the high percentage of tungsten and chromium used in the propellor clamp ring indicated that sufficient stocks of these alloying agents were availalbe at the time of manufacture.

PB 22387. GRENELL, L. H. and others. Examination of enemy materiel (OD-113; AC-77; M-119): Metallurgical examination of parts from a Japanese Mamoru-11 aircraft engine. Progress report 140, Oct 31, 1944. (OSRD Rept 4455). Dec 1944. 34 p. Price: Microfilm-50¢ - Photostat-$3.00
This report from the Battelle Memorial Institute covers the examination of parts of a Japanese Mamoru-11 radial aircraft engine for materials, methods of fabrication heat treatment and workmanship. Steels used contained more nickel, chromium and molybdenum than similar U.S. steels, but the nonferrous alloys are standard. Forging and machine operations were good, and the engine was built to the equivalent of American standards. Discussions of the tests made are followed by tables showing type of material, heat treatment and method of fabrication of metals in the various parts, and analyses of ferrous and nonferrous components, and a table of weights and markings of the engine parts. Photographs and tables are included.

PB 14589. LICHTENBERGER, F. Die untersuchung des temperaturverlaufes bei der verbrennung auf grund der heutigen erkenntnisse. (Investigation of combustion temperature based on present knowledge). (Reichsluftfahrtministerium, Ringbuch der Luftfahrttechnik III B 2). (Alsos Mission, Klotter File 11C) Oct 1937. 12 p. Price: Microfilm-50¢ - Photostat-$1.00
This is one report of the series published by the German air ministry. The determination of combustion temperature in engines by calculation, by optical means, and by thermocouples is described. The construction and use of Bosch and DVL thermocouples and the use of line spectroscopes and pyrometers are discussed. A comparison is made of the values and ranges of the different methods. Diagrams, graphs and bibliography are included.

PB 14691. VIEHMANN, H. Richtlinien für die prüfung von zündanlagen für flugmotoren (Procedure for the testing of aircraft engine ignition systems). (Reichsluftfahrtministerium, Ringbuch der Luftfahrttechnik III B4). (ALSOS Mission, Klotter File 11C) Jan 1938. 8 p. Price: Microfilm-50¢ - Photostat-$1.00
This report, one of a series published by the German Air Ministry, describes procedures for the testing of aircraft engine ignition parts, such as magnetos and sparkplugs. Various electrical tests are described as well as tests of vibration, corrosion, heating, and effect of altitude. Graphs, drawings, and a bibliography are included.

PB 14693. KEYNS, J. Die aufstellung der wärmebilanz bei untersuchung von flugmotoren auf den prüfstand. (Calorific balance graphs of aircraft engines when tested on a test-stand). (Reichsluftfahrtministerium, Ringbuch der Luftfahrttechnik III B 6). (Alsos Mission, Klotter File 11C) Apr 1938. 8 p. Price: Microfilm-50¢ - Photostat-$1.00
The efficiency of the water cooled multi-cylinder aircraft engine is effected by its heat loss. Various methods of determining calorific balance are described, such as by loss of heat through exhaust, by heat required for the chemical reaction by heating of oil, etc. The fuel-air ratio relation to the thermal balance is investigated. Graphs and bibliography are included.

Airports and Airways

PB 22923. PRENTICE, T. M. Construction and planning features of German airfields. (Naval Tech Mission in Europe Tech Rept 319-45) Sep 1945. 45 p. Price: Microfilm-50¢ - Photostat-$3.00
Eight German airfields were visited in order to observe German engineering practice and to discover anything new or unusual in methods of construction or in layout which might be of interest. The report is divided into two parts. Part I gives brief general descriptions of the airfields visited, and part II describes features of interest because they are indicative of German practice or because they are believed to be new or unusual. These are discussed under the following headings: landing surfaces, taxiways, aprons, dispersal areas, revetments, plane hides, hangars, other buildings and facilities, site planning, and camouflage. The following airfields are discussed: Mohra Field, Mitteldeutsche Metallwerke at Erfurt, Merseburg airport, Oschersleben airfield, Quedlingburg air station, Magdeburg airfield, Wesendorf airfield, and an experimental research airfield at Volkenrode. Photographs, charts, and plans are included.

LAND TRANSPORTATION

German

PB 18444. GERMANY. ELEKTROTECHNISCHES VERSUCHSAMT DER REICHSBAHN. Bericht A 7 IV/1944 über gleisüberwachung mittels spannungsstössen. (Report A 7 IV/1944 on control of railway lines equipped with voltage tension). (ALSOS Mission, MFR 302b) Mar 1944. 19 p. Price: Microfilm-50¢ - Photostat-$2.00
This report in German from the Electrotechnical Experiment Station for the State Railways is a continuation of report A 186U/1943 on the possibility of preparing railway lines with voltage tension (PB 18440), in which it was contemplated to provide a suitable contact tension to protect the general public who might come in contact with the rails. It is now decided that railway lines cannot be protected against sabotage by means of low voltage, and this point is discussed in detail. A distance of 4.7 km railway track between Aufhausen and Wifling has now been proposed for test purpose. The report contains drawings showing five different connections over the 4.7 km track; one plotted graph showing voltage drop along the track, two plotted graphs showing variable assistance, one diagram showing test circuit, and four photographs.

PB 18441. GERMANY. ELEKTROTECHNISCHES VERSUCHSAMT DER REICHSBAHN. Bericht A72V/1944 g über gleisüberwachungversuchsanlage für strecken bei Bf Aasling (SAWE) (Report A72V/1944 g: Rail control of tracks at the experimental place Bf Aasling (Sawe)). (ALSOS Mission, MFR 302b) Mar 1944. 8 p. Price: Microfilm-50¢ - Photostat-$1.00
This is a taird report from the Electrotechnical Experiment Station of the State Railways on the possibility of preparing railway lines with voltage tension. See PB 18440 for first report, and PB 18444 for second Report. This report discusses installation over a distance of 4.8 km between Aasling (SAWE) and Hart-Rothweinklamm and includes a railway station South Aasling 2.6 km from Aasling. The proposed installation is described in detail and includes two layouts of the track and railway station and a drawing showing connection of six rail test sections. In German.

PB 18447. GERMANY. ELEKTROTECHNISCHES VERSUCHSAMT DER REICHSBAHN. Bericht A 134 V/1944 über versuche mit einer gleisüberwachungsanlage (güwa) an der strecke Brest-Litowsk-Baranowitsche. (Report A 134 V/1944 experiment with a rail control installation of the track Brest-Litowsk-Baranowitsche). (ALSOS Mission, MFR 302b) 6 p. Price: Microfilm-50¢ - Photostat-$1.00
This is a fifth report from the Electrotechnical Experiment Station of the State railways on the possibility of preparing railway lines for voltage tension. See PB 18440 for first report, PB 18444 for second report PB 18441 for third report, and PB 18445 for fourth report. The super structure of this well known line is by far the most unfavorable for establishing an electric rail control. The rails are of German, Prussian, and Russian make, of various length and profile. The rail bed is of sand on which rest dried out and often decomposed sleepers. The track is illustrated in a drawing attached to the report. The report also includes a plotted curve showing course of voltage tension. In German.

PB 18445. GERMANY. ELEKTROTECHNISCHES VERSUCHSAMT DER REICHSBAHN. Bericht A 166R/1944 über besprechung bei betriebsamt Aasling. (Report A166R/1944 discussing the operation at Aasling). (ALSOS Mission, MFR 302c) Jun 1944. 2 p. Price: Microfilm-50¢ - Photostat-$1.00
This is a fourth report from the Electrotechnical Experiment Station of the State Railways on the possibility of preparing railway lines with voltage tension. See PB 18440 for first report, PB 18444 for second report, and PB 18441 for third report. This report continues the discussions of the installation at Aasling and mentions other operations being planned over greater distances such as at Feistritz Wocheinersee (28 km) and at Schwarzendorf (64 km). In German.

PB 18440. GERMANY. ELEKTROTECHNISCHES VERSUCHSAMT DER REICHSBAHN. Bericht A 186 U/1943 über beschickungsmöglichkeit eines gleises mit spannungsstössen. (Report A 186 U/1943 on the possibility of preparing railway lines with voltage tension). (ALSOS Mission MFR 302b) Oct 1943. 4 p. Price: Microfilm-50¢ - Photostat-$1.00
This report in German from the Electrotechnical Experiment Station for the State Railways discusses the possibility of electrifying railway tracks in France to safeguard them against sabotage. It was contemplated to provide a suitable contact tension to protect the general public who might touch them. Two drawings attached to the report show how railway lines may be prepared for voltage tension.

PB 18443. GERMANY. ELEKTROTECHNISCHES VERSUCHSAMT DER REICHSBAHN. Bericht A 209 R/1944 über besichtigung von strecken in den bezirken Oberkrain und Laibach. (Report A209R/1944 covering a survey of the stretch Oberkrain and Laibach district). (ALSOS Mission, MFR 302c) Oct 1944. 6 p. Price: Microfilm-50¢ - Photostat-$1.00
This is the sixth report from the Electrotechnical Experiment Station of the State Railways on the possibility of preparing railway lines for voltage tension. See PB 18440 for first report, PB 18444 for second report, PB 18441 for third report, PB 18445 for fourth report, and PB 18447 for fifth report. The survey is described in detail and contains one sketch and four photographs of the track. In German.

PB 18467. GERMANY. ELEKTROTECHNISCHES VERSUCHSAMT DER REICHSBAHN. Streckenüberwachung Krynno-Zablocie. (Control of the railroad track between Krynno-Zablocie). (ALSOS Mission, RFR 302c) Nov 1943. 46 p. Price: Microfilm-50¢ - Photostat-$4.00
This is the seventh report from the Electrotechnical Experiment Station of the State railways on the possibility of preparing railway lines for voltage tension. For other reports see PB 18440, PB 18444, PB 18441, PB 18445, PB 18447, and PB 18443. The survey in this report covers a distance of 14 km between the railway stations Zablocie and Krynno. The survey is described in detail and includes plotted graphs, drawing of rail control, electric installation and weather report. Four photographs intended for this report are omitted. In German.

PB 18438. GERMANY. REICHSVERKEHRSMINISTERIUM. Bisher gesammelte unterlagen für verfahren zur überwachung des gleiskörpers (Bases for methods of track control collected to-date). (ALSOS Mission, RFR 302 b). Dec 1943. 7 p. Price: Microfilm-50¢ - Photostat-$1.00
This is a report of railroad-division of the German traffic department to the Electrotechnical Research Bureau in Munich regarding tests made to determine methods of protecting tracks against enemy sabotage. Over a period of seven years the following methods were tested (1) Mechanical sound conductance through the rails, (2) Sound pick-up by microphone, (3) Control by direct current circuits through the rails either by using one rail and a separate return line or through both rails and a special relay arrangement and (4) Control by alternating current either with a 60 cycles or a tone modulated frequency. None of these systems proved to be satisfactory. The annex contains circuit diagrams and data to methods (3) and (4) and also a summary of a test using rails for telephone communication. In German.

United States

PB 25597. U. S. ARMY SERVICES FORCES. Higher echelon spare parts and equipment (addendum) for car, scout, M3A1. (Catalog ORD 8 SNL G-67) Apr 1945. 181 p. Price: Microfilm-$4.00 - Photostat-$13.00
This standard nomenclature list No. G-67 lists the estimated quantities of major items, maintenance parts and equipment required by Ordnance units for the maintenance of 100 of these vehicles for 12 months within a Theatre of Operations. Arranged in tabular form in 8 columns is the following information: The official stock number; Ordnance and manufacturers piece mark or part number; a descriptive title of the part; the estimated quantities of spare parts to maintain 100 scout cars for 12 months; the estimated quantity of parts required for major overhaul of 100 scout cars for 12 months; the total first year procurement for 100 cars for 12 months maintenance by all echelons. Photographs are included.

PB 25596. U. S. ARMY SERVICE FORCES. Organizational spare parts and equipment for car, scout M3A1. (Catalog ORD 7 SNL G-67) Mar 1945. 23 p. Price: Microfilm-$1.00 - Photostat-$2.00
This standard nomenclature list no. G-67 is a list of organizational spare parts and equipment which are issued to the using arm or service for its use in performing 1st and 2nd echelon maintenance. In tabular form are shown the estimated quantities of parts required by units performing 1,000 mile or 50 hour, and 6,000 mile or 100 hour maintenance service on this scout car, and the quantity of vehicular tools and equipment, vehicular armament, sighting and fire control equipment, vehicular ammunition, applicable cleaning and preserving materials and articles for instructional purposes. Photographs are included.

PB 25598. U. S. ARMY SERVICE FORCES. Organizational spare parts and equipment, higher echelon spare parts and equipment (addendum), service parts catalog for car, scout, M3A1, and changes No. 1-4. (Catalog ORD 7-8-9 SNL G-67) Feb 1944. 574 p. Price: Microfilm-$12.00 - Photostat-$39.00
This combined Standard Nomenclature List No. G-67 contains a general information section; Section 7, an organizational parts list and equipment list; Section 8-9, higher echelon spare parts and equipment list (addendum) combined with service parts catalog; an ordnance maintenance unit stockage list; and instructions on the method to be used in determining the quantities of parts to be stocked by Field Base and Mobile Depots. Also included are Changes 1,2,3, and 4, which indicate changes in parts up to March 1945. Sections 8-9, which comprise most of this report, list all serviceable parts in the vehicle and designate which of these parts are procured for maintenance. Column 7 gives 12 months field maintenance supply required for the 3rd and 4th echelon maintenance of 100 scout cars. Column 8 gives quantities of parts required for the major overhaul or 4th echelon maintenance for 100 vehicles for 12 months. Column 9 shows total first year procurement for maintenance by all echelons. Column 10 lists the estimated quantities of parts required to rebuild 100 vehicles. Photographs, exploded views, assembly diagrams, and alphabetical, numerical and official stockage number indexes are included.

PB 19131. U. S. WAR DEPARTMENT. Combined operation and maintenance manual and parts list: 10-ton refrigerator van semi-trailer. (Tech Manual 10-1611) Jul 10, 1943. 27 p. Price: Microfilm - 50¢ - Photostat - $2.00
This operation and maintenance manual covers a 10-ton, two-wheel, semi-trailer, refrigerator van. The equipment (American Body and Trailer Co.) consists of a fifth wheel and ramp, chock blocks, and landing gear. The net weight of the trailer is 12,000 pounds and the pay load is 10,000 pounds. Complete instructions are given for operation and maintenance of the semi-trailer. The brake equipment is manufactured by Bendix-Westinghouse Air Brake Company and a piping diagram for this system is included. Manual contains photographs, drawing, exploded views, wiring diagram, a lubrication chart, and a complete parts and price list.

PB 19128. U. S. WAR DEPARTMENT. Pump, gasoline dispensing, mobile, gasoline-engine-driven, 100 gals. per minute (Habhegger - "PM-100"). (Tech Manual 10-1660) Jun 15, 1945. 127 p. Price: Microfilm-$1.50 - Photostat-$9.00
This mobile gasoline dispensing unit is usually mounted on a trailer and has a rotary pump which is gasoline engine driven, a 100 foot reel of 3 inch suction hose and four 75 foot reels of 1½ inch hose. The one cylinder engine develops 8 hp at recommended speed. Following the description of the unit are instructions for the operation maintenance, and repair of the equipment and its components. Photographs, charts, and tables are included.

PB 19137. U. S. WAR DEPARTMENT. Semi-trailer, 2 wheel, 10 ton gross, refrigerator (Hyde Corporation). (Tech Manual 10-1674) Apr 1945. 38 p. Price: Microfilm-50¢ - Photostat-$3.00
This two wheeled refrigerator trailer is attached to its tractor by a fifth wheel with specially constructed locking jaws. Instructions are given for the operation and maintenance of the refrigerator body and its component parts, including wheel, and axle assembly, brake system, chassis, body and spring suspension. Photographs, diagrams, charts and complete parts lists are included.

PB 19138. U. S. WAR DEPARTMENT. Truck, fork lift (electric-sparkproof) Automatic Transportation Co., model TEFP-L. (Tech Manual 10-1651) Nov 20, 1944. 209 p. Price: Microfilm-$2.50 - Photostat-$14.00
This fork lift truck employs separate electric motors for the drive, elevating and tilt units. These are "Automatic" types F, D, and AE respectively. A 450 ampere-hour battery assembly is used to power this equipment. The drive unit motor has a continuous rated output of 2.5 to 31 hp. Following the descriptions of the main units are instructions for the operation, maintenance and repair of the assemblies that make up this fork lift truck. Photographs, charts, tables, parts assembly diagrams and complete parts lists are included.

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